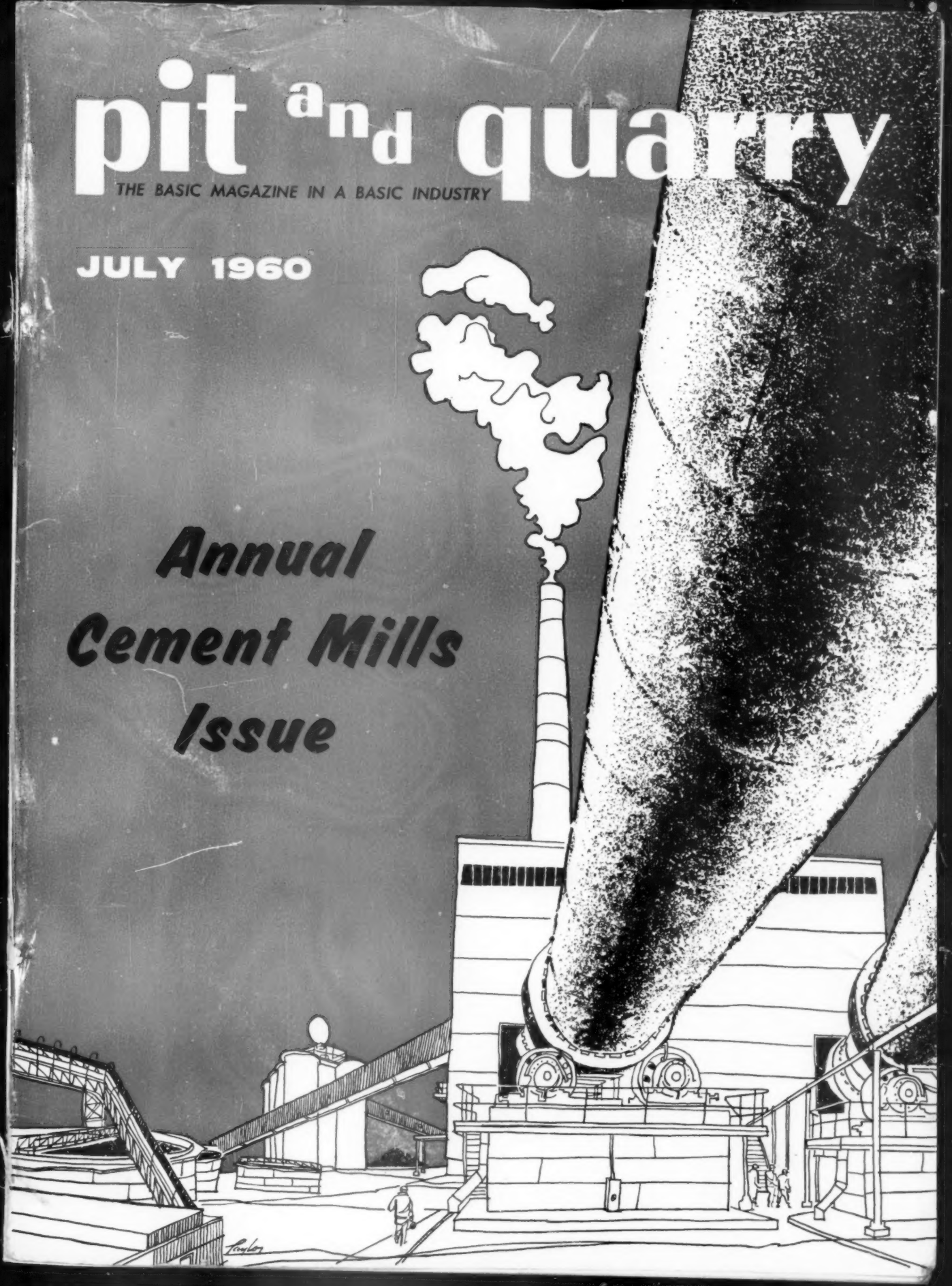
pit and quarry

THE BASIC MAGAZINE IN A BASIC INDUSTRY

JULY 1960

Annual Cement Mills Issue



NEW Crawlmaster drill and Gyro-Flo compressor

...most versatile and powerful combination available for 4" to 6½" blast holes

THE INGERSOLL-RAND CRAWLMASTER is a multi-purpose blast-hole rig with extra weight and power for the toughest drilling jobs. This rugged machine is mounted on dozer-type crawlers with enclosed gear drive from two 11½-hp air motors, and interchangeable drill units permit percussion, rotary or Downhole drilling of 4" to 6½" holes at any angle from vertical to horizontal. Features include hydraulic feed and retraction, remote controlled reverse rotation, 30" hydraulic leveling jacks and simple ejector-type dust collector.

Ample air power for all Drillmaster functions is provided by a 900-cfm Gyro-Flo rotary compressor—the last word in portable compressor economy and dependability. Simplicity of operation, freedom from maintenance, small size and light weight, air temperatures under 200°F, low oil consumption and closer regulation at all loads make Gyro-Flo the ideal running mate for the new Crawlmaster drill.

Ask your I-R distributor or engineer for complete information on the cost-saving Crawlmaster Gyro-Flo combination.

Ingersoll-Rand

67A14 ♥ 11 Broadway, New York 4, N. Y.

A CONSTANT STANDARD OF QUALITY IN EVERYTHING YOU NEED FOR DRILLING ROCK

Enter Cover 2 on card, page 257

You never had 'em so tough!

HARD ROCK LUG XTRA TRED

Here it is! From Goodyear's advanced technology and processes—

HARD ROCK LUG XTRA TRED—the mine and quarry tire that's built with extra tread to take it where the going's tough!

It's made with 3-T Nylon Cord—triple-tempered by Tension, Temperature and Time—that makes *the world's toughest tire bodies.*

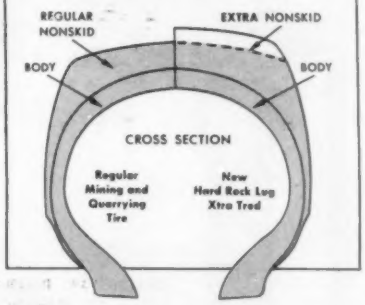
It has specially compounded rubber that embodies remarkable super-toughening agents for far greater chip-, wear- and penetration-resistance—that produces *the world's toughest treads.*

And, with its thicker nonskid tread depth (as much as 71% thicker) for harder-biting, longer-wearing lugs, you take out *more pay loads in less time and at lower cost*—with fewer maintenance headaches, too!

Ask your Goodyear dealer about Hard Rock Lug Xtra Treds, *now.*

Goodyear, Truck Tire Department, Akron 16, Ohio.

MORE AND TOUGHER RUBBER IN THE RIGHT PLACES!



THE WORLD'S TOUGHEST TRUCK TIRES BY

GOODYEAR

Xtra Tred—T. M. The Goodyear Tire & Rubber Company, Akron, Ohio

MORE TONS ARE HAULED ON GOODYEAR TRUCK TIRES THAN ON ANY OTHER KIND

Enter 1 on card, page 257

PIT AND QUARRY, July, 1960. Vol. 53, No. 1. Published monthly by Pit and Quarry Publications, Inc., 431 South Dearborn St., Chicago 5, Ill. Subscription price $3 for 1 year in the U.S., possessions and Canada. Central and South America $10 for 1 year, elsewhere $15. Single Copy $.50 except $1 for January, May and July. Entered as second class matter February 28, 1932, at the Post Office at Chicago, Ill., under the Act of March 3, 1879. *Postmaster: Please send notices on Form 3578 and copies returned under label Form 3579 to 431 South Dearborn Street, Chicago 5, Ill.*

No alignment worries! LINK-BELT bucket elevators go

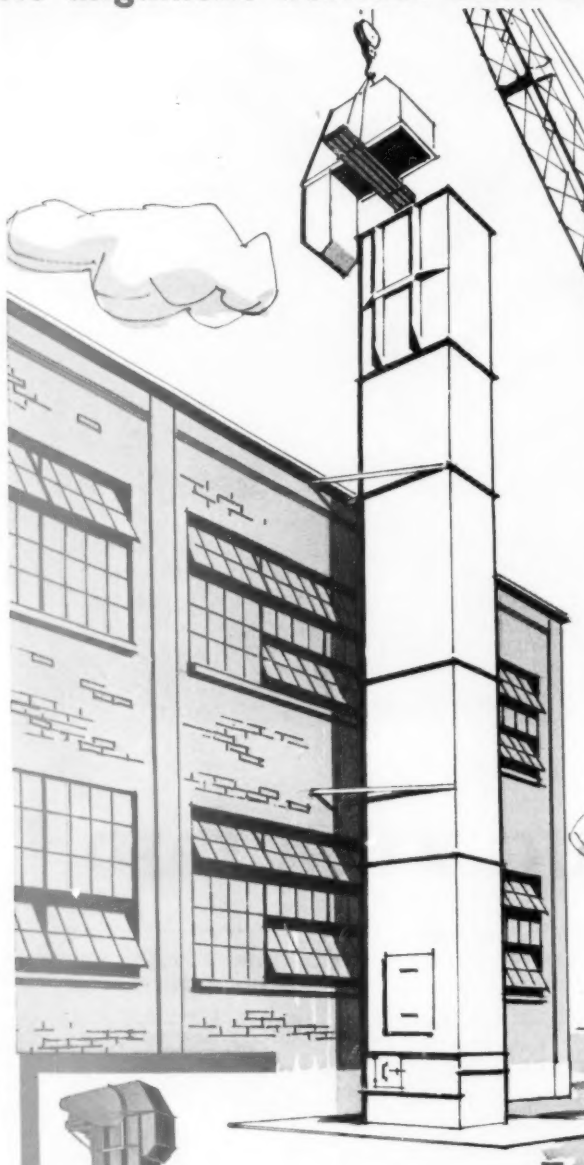
straight up... fast and easy

Factory-aligned components assure low-cost installation, smooth performance

Yes, Link-Belt bucket elevators go up easy . . . and they go up *straight!* There's no misalignment to cause inefficiency, bucket and casing wear.

Link-Belt manufactures *all* bucket elevator components . . . eliminates installation and operational problems in the *factory*, not in the field! All components are carefully designed and manufactured. Casings are jig-welded for perfect, ready alignment. Result: Unnecessary erection costs and difficulties are avoided, long-lasting efficiency assured.

Link-Belt will gladly erect your elevator (large or small) and accept full installation responsibility. For details, contact your nearest Link-Belt office. 15,307



CENTRIFUGAL DISCHARGE bucket elevators are designed to handle free-flowing, fine and loose materials with small to medium lumps. Type 14 (shown) is built for high capacities.

Link-Belt's complete bucket elevator line includes 14 types in 4 basic designs . . . centrifugal, positive, continuous and internal discharge. Also a wide variety of buckets . . . steel, malleable iron, Promal or alloy metals.

LINK-BELT

BUCKET ELEVATORS

LINK-BELT COMPANY: Executive Offices, Prudential Plaza, Chicago 1. To Serve Industry There Are Link-Belt Plants, Warehouses and District Sales Offices in All Principal Cities. Export Office, New York 7; Australia, Marrickville (Sydney); Brazil, Sao Paulo; Canada, Scarboro (Toronto 13); South Africa, Springs. Representatives Throughout the World.

PIT and QUARRY

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NBP BPA

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Published on the first of each month for producers and manufacturers of Cement, Crushed Stone, Gypsum, Lime, Sand, Gravel, Slag and other nonmetallic minerals.

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To subscribers: When requesting change of address, kindly send old as well as new address.

PIT AND QUARRY IS INDEXED IN THE ENGINEERING INDEX

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✓ *Indicates a* PIT AND QUARRY *staff-written report*

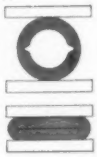
The Company that cares enough to give you the best!

Massco-Grigsby

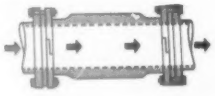
PINCH VALVES

RUBBER, NEOPRENE
for Corrosion and Abrasion

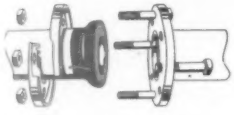
- 1" to 14" inside diameter.
- Pressures to 150 psi.
- Temperatures to 200° F.
- Patented "hinged" sleeve. Recesses serve as "hinges" during compression; reduce strain and permit tight closing.



- Cannot leak or stick.
- No working parts in contact with pulp or liquid; no packing glands.



- Unobstructed flow eliminates high friction loss.
- Remote control available.
- Can be equipped for automatic regulation.



- Split flanges and patented Flex Seal ends assure perfect seal.
- Closing mechanisms... manual handwheel; handwheel with chain and sprocket reduction unit; electric worm gear motor reducer; chain operated torque arm reducer; hydraulic; air-hydraulic.

WRITE FOR NEW CATALOG...

Manufacturing Division

MINE AND SMELTER SUPPLY CO.

3800 RACE STREET • DENVER, COLORADO
OFFICES AND AGENTS IN PRINCIPAL CITIES

Enter 4 on card, page 257

pit and quarry

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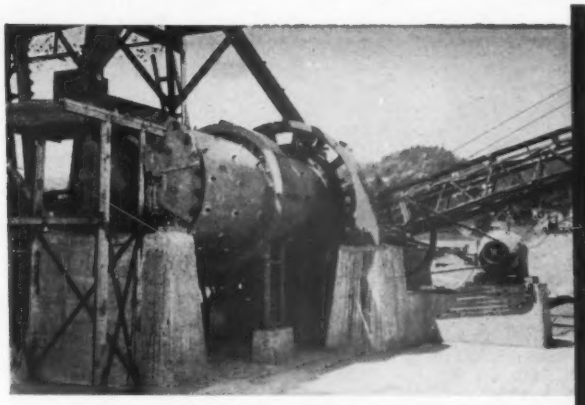
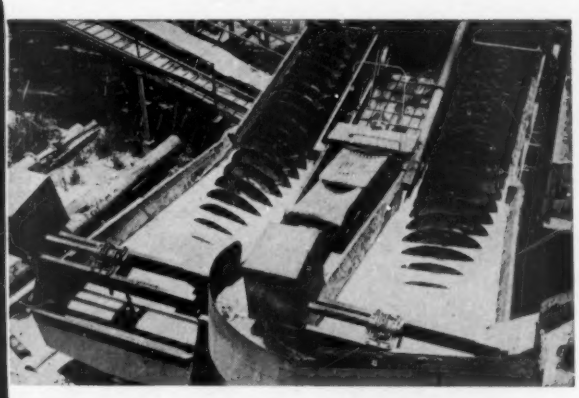
Need specification aggregate?

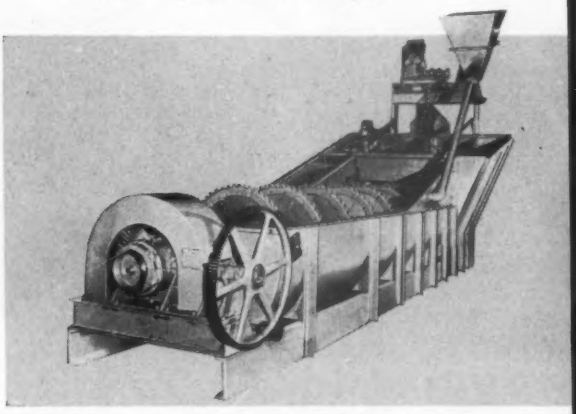
4 low-cost ways to produce it, on location!



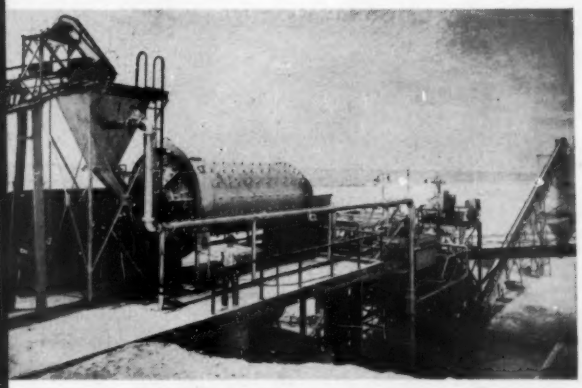
1 *Grinding with Marcy CPD Rod Mills* Grinding stone or waste pea gravel in a Marcy Mill results in a superior, cubical product for blending to meet the most rigid specifications. Marcys have kept many small operators in business; and, have been used on almost all large government dam jobs.



2 *Washing and Classifying with Akins Classifiers* With the Akins Classifier you can wash, deslime, dewater, and *remove or save* sand sizes as desired. A large *working* pool area in classifier is required to do this work...the Akins gives you more working pool area per dollar.



3 *Separating with Akins Heavy Media Separators* Many deposits can be most efficiently treated by the Akins heavy media process. The Akins' large working pool area permits close control of products from feed of variable quality or quantity. Reduced media recirculation in the Akins results in lower total horsepower required.



4 *Scrubbing with Marcy Heavy-Duty Scrubbers* Thorough, efficient removal of clay from sand can be accomplished with Marcy Scrubbers. The Marcy principle of small diameter, long length scrubbers gives longer retention time, more contact for scrubbing, less short-circuiting, and lower horsepower...a principle which has been proven on difficult washing of iron ore.

Write for Complete Information

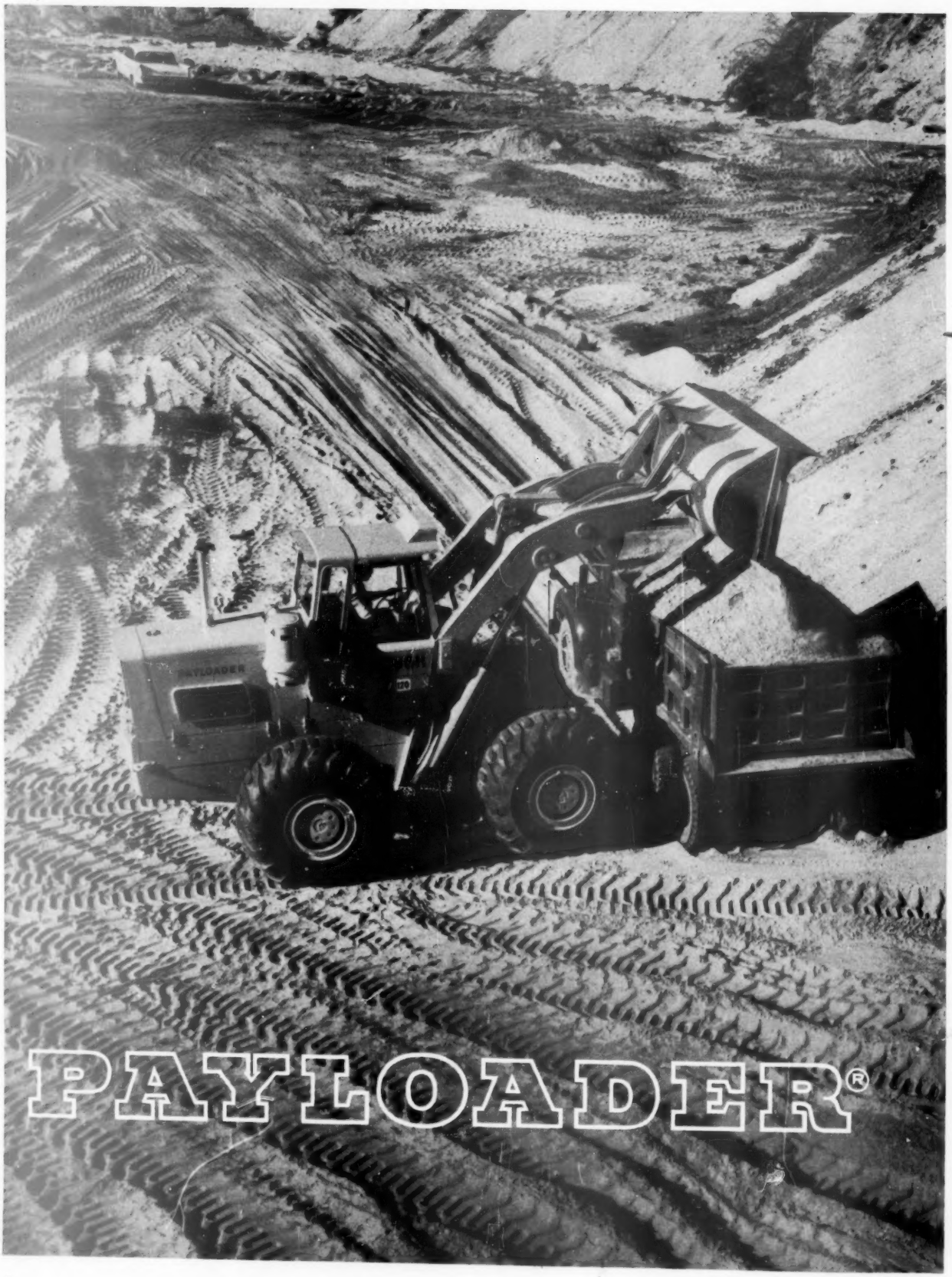
The Company that cares enough to give you the best!

Manufacturing Division

MINE AND SMELTER SUPPLY CO.

DENVER 16, 3800 RACE ST. | NEW YORK 17, 122 E. 42nd ST. | SALT LAKE CITY 1, 121 W. 2nd S. | EL PASO, 1515 11TH AVE. | ALBUQUERQUE, 701 HAINES N.W.

Licensed Manufacturers and Sales Agents in Canada, Australia, Sweden, England, South Africa
Sales Agents in Peru, Chile, Philippine Islands, Japan, New York City (for Continental Europe) and in principal cities of the United States.


PAYLOADER®

Reports continue to show H-120 setting unmatched standards of production and

performance

Owners and operators testify that this tractor shovel outperforms and outproduces larger, more costly machines

Superintendent Says: "This machine has plenty of power to get maximum loads under all working conditions. The roll-back bucket action heaps and keeps the full load during delivery cycle. The material just seems to flow into the bucket during digging with an absolute minimum effort and no strain whatsoever. The high lift and long reach enables the operator to distribute the load on the truck, enabling the trucker to haul a maximum balanced load to state road specifications."

Owner Says: "The H-120 is fast and maneuverable, does numerous jobs that save us time and extra equipment."

Operator Says: "Jobs just don't come too big for this machine. Has power to spare. The H-120 gives maximum traction with no wheel spin. I like the comfort and ease of operation. It is a well balanced machine."

Operator Says: "The H-120 has unmatched pry-out power and more digging power than any other large rubber-tired loader. The machine never runs hot no matter how hard the digging gets. It has good load-carrying balance."

Plant Manager Says: "We needed a versatile machine for large truck and rail car loading and the H-120 with its long reach was the answer to our needs. This unit gives us a 15-foot reach with ease and has very efficient loading speeds. It never uses full power and it fills the bucket with minimum effort. The H-120 has replaced two other loading machines."

Operator Says: "I like the H-120 better than anything I've ever run. It's faster, comfortable and easy to handle. The balance is perfect and the safety and visibility is tops because of the lift arm design. The high lift and long reach let me center loads in gondolas of rail cars."

Owner Says: "The additional capacity of the H-120 and its faster load-out speeds has cut our basic hauling equipment needs in half on the pit-to-plant short haul operation. The high reach of the bucket gives evenly distributed loads which makes it easier on the hauling equipment."

Operator Says: "I know I can handle at least 400 tons per hour and that includes a lot of moving from screen plant to conveyor, or hopper or stockpile. I like the feeling of balance and complete control at high speed operation of this big loader. It may not seem important but there are no sickening fumes coming from a fuel tank filler cap under my nose and there are no lifting arms sweeping past my elbows. I consider it the safest, easiest operating loader I have seen in my long construction experience."

Superintendent Says: "The better balance, speed and maneuverability of the H-120 makes it a better buy than larger competitive models tested on the job."

Operator Says: "I haven't had to work very hard since putting the H-120 loader on the job. Even with a 23 truck fleet on a short haul, I am waiting for trucks. One day we moved 5,800 tons and could better that if we had a few more trucks. This unit is the fastest working big loader we have ever tried. It's a dream to operate with power controls, fast responses and clear, open vision of the bucket and of the area all around the loader at all times."

You must see the H-120 in action to appreciate its outstanding performance – how it can put out big yardage so easily. With buckets from 4 to 8 cu. yds., more horsepower, higher dumping clearance (10'10"), longer reach (3'6") and many other superior features it is the big news in tractor-shovels. See your Hough Distributor today, or return the coupon.

HOUGH®

THE FRANK G. HOUGH CO.
LIBERTYVILLE, ILLINOIS
SUBSIDIARY — INTERNATIONAL HARVESTER COMPANY

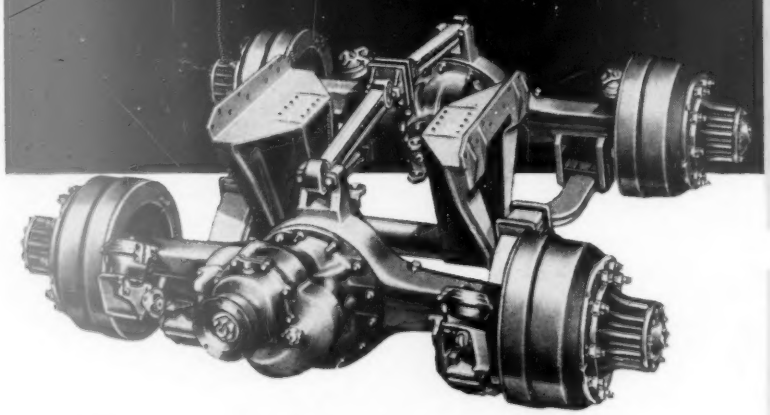
THE FRANK G. HOUGH CO.
750 Sunnyside Ave., Libertyville, Ill.
Send full data on the big Model H-120 "PAYLOADER."

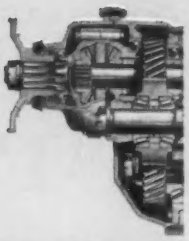
Name_____
Title_____
Company_____
Street_____
City_____ State_____

7-B-5

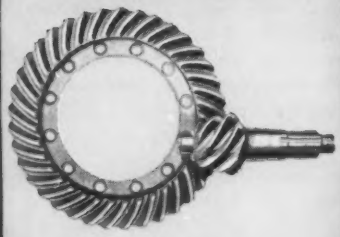
MORE THAN 200 MILLION EXTRA TON-MILES OF PAYLOAD IN JUST 5 YEARS

WITH TIMKEN-DETROIT® LIGHTWEIGHT TANDEMS

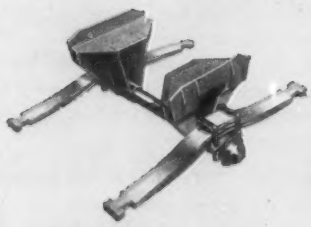




Driver Controlled Inter-axle Differential. Allows differential action between the axles to compensate for worn or mismatched tires . . . both axles do equal amounts of work. Can be dis-engaged at any speed giving positive thru-drive when better traction is needed.



Stronger Gear Sets. Hypoid gearing provides up to 30% more strength than spiral bevel gears of the same size. Modern hypoid design allows larger and stronger pinions with greater tooth contact area . . . assuring top efficiency and long life.



New Suspension Pushes Tandem Weight Savings Over 1000 Lbs. Rockwell-Standard's "taper-leaf" springs coupled with the latest in balanced suspension system designs is up to 475 lbs. lighter than comparable units. When combined with the payload advantages of the Lightweight Tandem you can save more than 1000 pounds per trip. This means thousands of ton-miles in extra payload per year.

In the five years since Rockwell-Standard introduced Timken-Detroit Lightweight Tandems, thousands of users have rolled up millions of extra ton miles of payload. Check the superior features illustrated at right. They are some of the reasons why these axles are first choice with over-highway operators:

Plus these additional Timken-Detroit advantages:

- In-line drive reduces wear on working parts
- High degree of parts interchangeability
- Large selection of gear ratios
- Torsion-Flow axle shafts
- Wide range of capacities – 8 models from 22,000 to 44,000 pounds

Another Product of... **ROCKWELL-STANDARD CORPORATION**

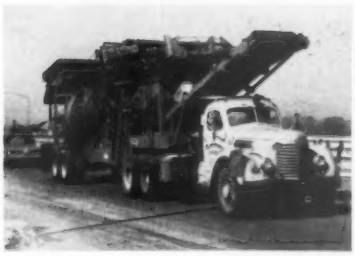
ROCKWELL R STANDARD®

Transmission and Axle Division, Detroit 32, Michigan

Enter 8 on card, page 257

Needed: 190 tons of ¾″ minus aggregate per hour

New Diamond Plant Gets Job



Another feature that impressed Frank Strausberg is the portability of the new Diamond model 70 rotor-lift crushing plant. It is equally at home on the road or in the pit.

Diamond makes everything for the aggregate producer:

Jaw Crushers • Roll Crushers • Conveyors • Screens and Washers • Feeders and Bins • Portable and Stationary Crushing Plants for Rock and Gravel.

When Frank Strausberg & Son, Saginaw, Michigan contracting firm, was awarded a contract for aggregate for asphalt surfacing and shoulders on State Route 57, it needed a crushing plant that had plenty of capacity and portability. Diamond Iron Works sales engineers were called in and asked for their recommendations.

Based on a thorough and convincing analysis of the problem, Strausberg purchased the *new* Diamond model 70 rotor-lift crushing plant. Here are the results. Currently, it is producing ¾″ minus aggregate for asphalt surfacing at the rate of 190 tons per hour. All material is pit run requiring 48% crush and subject to state check four times a day. The plant is moved about every three days in the pit, or to other pits. It has more than lived up to expectations for high capacity and portability. Also, of particular importance has been the smooth performance plus an unusually low horsepower requirement.

Other Features of the New 70

- **10″ x 36″ roller bearing jaw crusher**
- **32″ x 24″ star gear roll crusher—a large crushing area for more crushing per revolution of rolls**
- **4′ x 12′ 2 ½-deck screen that provides more than adequate screening area**
- **30″ conveyor belts throughout (5-ply, 28 oz.)**

High output, portability and economy of operation . . . that's what the new 70 has done for Frank Strausberg & Son . . . that's what it can do for you. See your DIAMOND distributor for the full story.

DIAMOND IRON WORKS
DIVISION
GOODMAN MANUFACTURING COMPANY
Halsted Street and 48th Place • Chicago 9, Illinois

DIAMOND

Enter 9 on card, page 257

ARMCO DREDGE PIPE

Helps Widen Louisville-Portland Canal

Armco Special Analysis Steel Pipe will carry 2½-million cubic yards of mixed sand and silt for the Louisville-Portland Canal dredging job near Louisville, Kentucky. The canal is to be widened from 200 feet to 500 feet.

The dredging contractor, Dunbar and Sullivan Dredging Company, is using 1000 feet of 22-inch inside diameter Armco Pontoon Pipe in 40- and 80-foot lengths. Wall thickness of the pipe is .438". As an extra service, the ball joint, seen at left in photo, was welded on the pipe before it left the factory. Accessories used in this and many other dredging operations throughout the country are Armco standard fabricated elbows and Armco standard shore pipe.

Armco Special Analysis Steel Pipe is made of special steel developed by Armco to withstand abrasive materials and rough service. Write us for the free illustrated folder on Armco Special Analysis Steel Pipe. Armco Drainage & Metal Products, Inc., 6790 Curtis Street, Middletown, Ohio.

ARMCO DRAINAGE & METAL PRODUCTS

Subsidiary of ARMCO STEEL CORPORATION

OTHER SUBSIDIARIES AND DIVISIONS: Armco Division • Sheffield Division
The National Supply Company • The Armco International Corporation
Union Wire Rope Corporation

Washington News Letter

By S. HERBERT UNTERBERGER

PARTICULARly in an election year, everybody who is anybody leaves Washington in July. The politicians go home for a little fence-mending and then move on to the political conventions. Government officials, who have just been through a prolonged and trying Congressional session, run off for a quick vacation.

Generally, this is a time for relaxing in Washington because, at least for a short while, the pressure is off. This year, however, the situation appears to be very different. Because of the extraordinary number of international tensions, everyone connected with these situations is afraid to leave. This is true not only in the State Department and the intelligence agencies but also in those parts of the Departments of Commerce and Labor which have some responsibility in foreign affairs.

The situation is especially difficult because these people are alerted to any eventuality, without having the vaguest idea of what to expect or where to look for the next development. There appears to be almost complete uncertainty about what is motivating the Russians in their present behavior. Almost any theory is as good as any other. Thus, there are significant groups who analyze the whole situation in terms of the personal insecurity of Premier Khrushchev.

There are others who disregard this idea completely and spend all of their time explaining that the real originating force of the current international tension can be found only in China.

There are still others who would disregard the immediate problems almost entirely as being transitory; these persons want to devote all of their attention to improving relations with the declining number of uncommitted countries.

A pretty volatile mixture of politics and international uncertainty is brewing. This situation is really different from those in most of the past election years, when the heaviest emphasis was on domestic problems. Even in this area, great uncertainty has developed.

While 1960 started out to be a boom year, it has not come up to expectations. There is wide disagreement about what the rest of the year will bring. While some experts are predicting a measure of stability, others see 1960 as a year of initial decline and then expansion. None look forward to a big boom again.

Politically, this means that in the forthcoming campaign there will be innumerable issues, none of which are clear-cut. With a growing similarity between the positions of the two political parties, victory will probably go to the one whose candidate gives the impression that he is better able to cope with still unanticipated problems.

This is a far more difficult position to be in than those which faced either Eisenhower or Roosevelt. It is more analogous to the Truman situation. In his original campaign, President Eisenhower was able to dramatize the Korean crisis into the single most important issue of the campaign; and for that he had an immediate practical solution. This gave him a tremendous advantage.

Similarly, President Roosevelt, in each of his campaigns, was able to dramatize either unemployment or the war into the single most important issue and, in each case, he had the practical program to meet that issue.

The problem faced by Truman and Dewey was that there was no single issue immediately available which either one could dramatize and make critically important. As a result, there was much floundering. Finally, President Truman was able to do something with his "do-nothing Congress" issue. It was probably this which made the difference. It certainly confounded the experts and the predictors. Indeed, it even confounded the vote counters on the night of the election.

The current situation, fundamentally, is not very different from that of 1948. Internationally, while we are not actually engaged in shooting at an active enemy, we are as close to that point as we dare to go.

Domestically, a large number of the important problems continue to be unsolved. The problem of racial integration continues to divert the energies of a large number of people who might otherwise be contributing more effectively to the total welfare.

Economic instability also continues to prevent full utilization of our resources. A part of this latter problem is the matter of inflation. Unless it is carefully controlled, inflation could seriously diminish economic progress. At the same time, the present methods of control, particularly those exercised through manipulation of the interest rates, are less than fully successful. They, too, frequently prevent production which might otherwise be achieved.

It is a matter of special significance that none of these problems has reached a "crisis" stage; and this has become the principal obstacle to those who are planning the

(*Continued on page* 82)

VERSATILE CAT DW20-SCRAPER MAKES SHORT WORK OF EVERY JOB

Cat DW20G-456B dumps onto a conveyor at Rhodes and Jamieson's Fremont plant.

Big loads to the crusher; high-speed hauling; and fast, low-cost stripping with the same machine slash costs for sand and gravel plants. This is the all-job performance Rhodes and Jamieson, Ltd., of Fremont, Calif., expect and get from their five Caterpillar DW20-456 Tractor-Scrapers.

At Fremont, three DW20s, pushloaded by a Cat D9 Tractor, speed sand and gravel 2,000 yards to the washing and screening plant. At nearby Pleasanton, two DW20s, also pushloaded by a D9, easily supply material on a ¼-mile haul. The same scraper fleets also strip overburden to further reduce costs.

Cat-built equipment has been first choice for Rhodes and Jamieson since the Fremont plant opened in 1951. The high-production, low-cost DW20G-456B handles the toughest loading and hauling jobs. The DW20G's 345 HP (max. output) turbocharged Cat Diesel Engine provides travel speeds to 35.8 MPH. Its 456B LOWBOWL Scraper carries 19.5 cu. yd. struck, 27 cu. yd. heaped. Optional SynchroTouch Transmission Control lets the operator simply dial the desired gear for automatic, split-second shifting.

Find out how you can cut your equipment and production costs with this all-purpose earthmover. Call your Caterpillar Dealer.

Caterpillar Tractor Co., General Offices, Peoria, Ill., U.S.A.

CATERPILLAR

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HIGH PRODUCTION AT LOW COST— THE DW20-456 TEAM

Labor Developments

IN fulfilling the requirements of the recently enacted Landrum-Griffin law, the U. S. Department of Labor properly gave priority to the implementation and enforcement of the provisions designed to correct corruption in labor unions. This was the principal area of difficulty revealed by the investigation of the McClellan Committee.

That legislation, however, both in an attempt to mete out even-handed judgments and to eliminate employer corruption wherever it appeared, also included many requirements with which employers had to conform. The Department of Labor recently issued the forms and regulations to be used for this purpose.

Every employer whose fiscal year has ended since September 14, 1959, must, if he has done some of the things covered by the Act, file such a form immediately. Failure to file when required subjects these employers to a number of criminal penalties set forth in the law. If the answer to any one of the following questions is "yes," the employer is required to file Form LN-10.

By S. HERBERT UNTERBERGER

S. Herbert Unterberger and Company
Economists-Consultants on Labor and Industrial Relations
Washington, D.C.-Philadelphia, Pa.

QUESTION 1 — *During the past fiscal year did you make or promise or agree to make, directly or indirectly, any payment or loan of money or other thing of value (including reimbursed expenses) to any labor organization or to any officer, agent, shop steward, or other representative or employee of any labor organization?*

In answering this question, it is important to know that none of the following activities requires a "yes" answer:

(a) Payments in the regular course of business to a class of persons determined without regard to whether they are, or are identified with, labor organizations and whose relationship to labor organizations is not ordinarily known to or readily ascertainable by the payer—*e.g.*, interest on bonds and dividends on stock issued by the reporting employer.

(b) Loans made to employees under circumstances and terms unrelated to the employees' status in a labor organization.

(c) Payments made to any regular employee as wages or other compensation for service as a regular employee of the employer, or by reason of his service as an employee of such employer, for periods during regular working hours in which same employee engages in activities other than productive work, if the payments for such periods of time are: (1) required by law or a *bona fide* collective bargaining agreement, or (2) made pursuant to a custom or practice under such a collective agreement, or (3) made pursuant to a policy, custom, or practice with respect to employment in the establishment which the employer has adopted without regard to any holding by such employee of a position with a labor organization.

(d) Initiation fees and assessments paid to labor organizations and deducted from the wages of the employees pursuant to individual assignments meeting the requirements of the Labor Management Relations Act.

(e) Sporadic or occasional gifts, gratuities or favors of insubstantial value, given under circumstances and terms unrelated to the recipients' status in a labor organization—*e.g.*, traditional Christmas gifts.

QUESTION 2 — *During the past fiscal year did you make, directly or indirectly, any payment (including reimbursed expenses) to any employee, or to any group or committee of your employees, for the purpose of causing them to persuade other employees to exercise or not to exercise, or as to the manner of exercising, the right to organize or bargain collectively through representatives of their own choosing without previously or at the same time disclosing such payments to all such other employees?*

In answering this question it is permissible to exclude expenditures made to any regular officer, supervisor, or employee as compensation for services as a regular officer, supervisor, or employee.

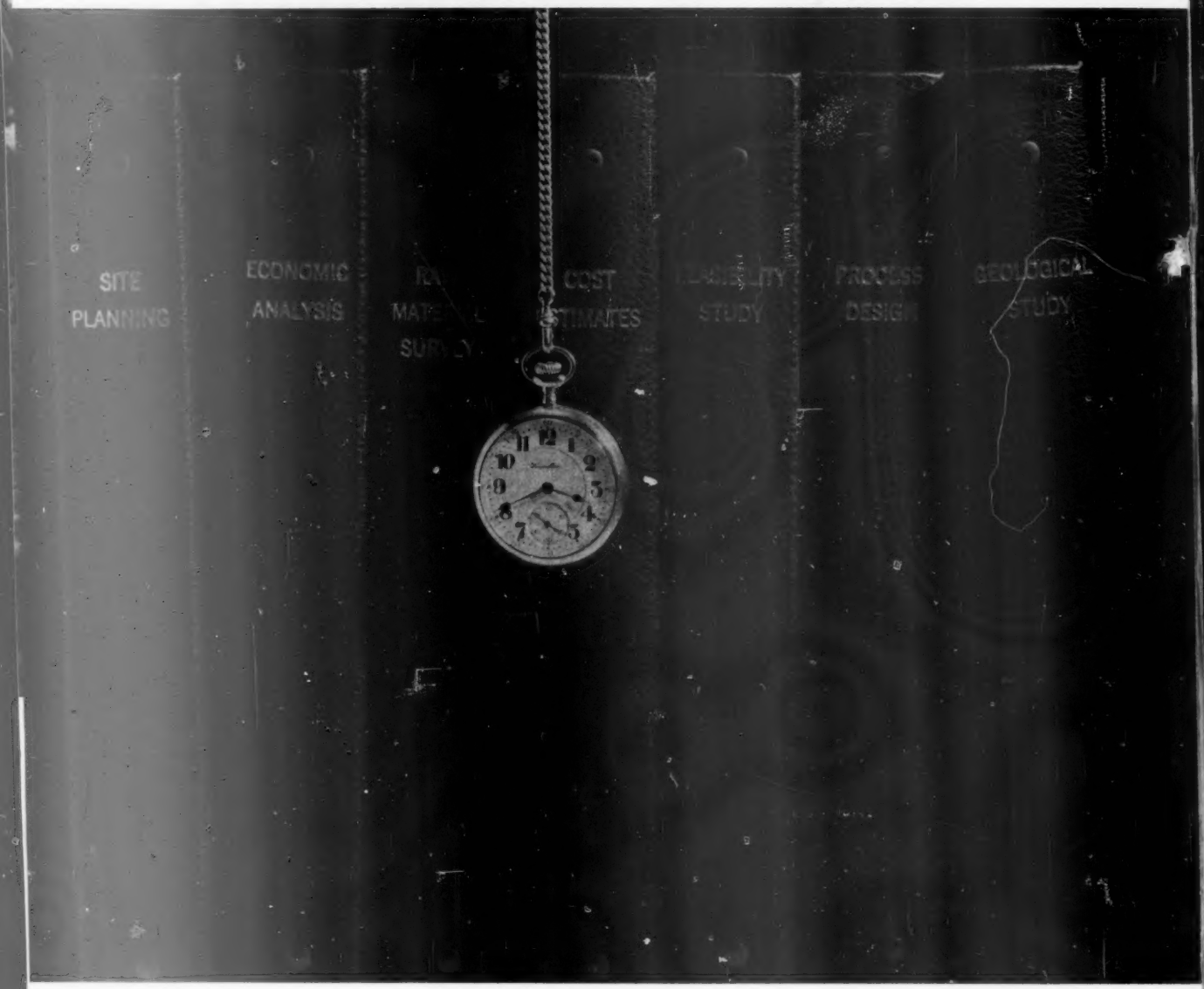
QUESTION 3 — *During the past fiscal year did you make any expenditure wherein an object thereof, directly or indirectly, was to interfere with, restrain, or coerce employees in the right to organize and bargain collectively through representatives of their own choosing?*

This is a very broad question. It should be noted that the terms "interfere with, restrain, or coerce" have the same meaning in this connection as in connection with the interpretation of the National Labor Relations Act.

QUESTION 4 — *During the past fiscal year did you make any expenditure where the object thereof, directly or indirectly, was to obtain information concerning the activities of employees or of a labor organization in connection with a la-*

(*Continued on page 78*)

Pre-Engineering by **KAISER ENGINEERS** answers basic plant expansion questions...



Timely? Many complex factors shape the final decision to proceed with your expansion plans... and timing is an important one. Independent analysis of all aspects of your proposed program is the *Pre-Engineering* service offered by Kaiser Engineers. The studies and evaluations furnished by KE Pre-Engineering represent only one phase of total KE services. Kaiser Engineers is an experienced designer and builder of all types of facilities for the Minerals industry. From Pre-Engineering through design and construction, Kaiser Engineers provides complete, one-company service and ingenuity based on years of experience.

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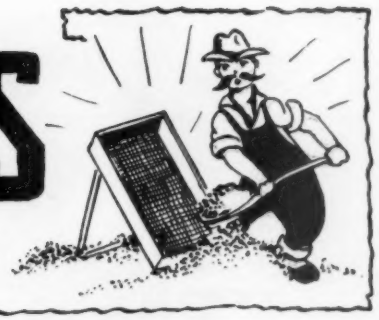


By RAY L. SMITH JR.

WHEN JESSE JAMES gave up free-booting off defenseless travelers, his job was well covered by these fellers who work in big hotel washrooms.

These guys have a better deal than a politician with both hands in the public cookie jar.

Up in the big city recently, this farm boy dropped into the little boy's room for a handwash job.

Finally, with drippy hands, we looked for the paper towel dispenser or one of those hot air blowers that keeps hands and face from chapping. There appeared to be neither.

A little guy with dollar marks for eyeballs asked if he could be of assistance. He offered, with dollar-bill colored pupils, if we'd like a towel.

We answered Okay and he forked over a handkerchief-size towel.

"That'll be fifteen cents, young fellow," he chortled.

We forked over two-bits and waited patiently for change while this modern-day highway man fished through thirteen pockets, for a dime. He handed over the ten cent piece like a kid forced to share a chocolate pie with a brother.

By this time we could see what the attendant was leaning on . . . the hot air (nonchapping) blower, of course.

Between the sink and the door we had offers of shoe shines, showers and even change for one of those machines that hang on those little square booths.

To be sure, all of the money changers have not been kicked out of the temple.

Potpourri and Succotash

We could have had a sputnick in the air a long time ago if all our scientists hadn't been too busy testing cigarettes.

Frustration: Do you honestly believe your problems are serious? Consider the case of the two sailors who survived a shipwreck and managed to drift and swim to a small desert island. After about 15 months of their solitary life they spotted a bottle floating in the ocean. Eagerly they fished it out, opened it, and found a note from two gals who were stranded under similar circumstances on another desert island.

When the Hale Junior High School cafeteria in San Diego, California ordered six new freezers, they were delivered equipped with three-prong electrical plugs. The wall receptacles in the cafeteria were designed for two-prong plugs. The following day, two electricians arrived to put things right. One changed the plugs to two prongs. The other changed the wall receptacles to three prongs.

"I'm not wealthy and I don't have a yacht and a convertible like Jerome Green," apologized the suitor. "But, I love you."

"And I love you, too," replied the girl, "But tell me more about Jerome."

A beautiful girl was being tried for killing her husband. The jurors retired. They knew she was guilty, but they didn't want to sentence her because of her beauty—yet they feared to face their wives if they didn't. Finally, one of them happened to remember that the dead man had been an Elk. They passed this sentence: Twenty dollars fine for killing an Elk out of season.

"How did your brother die?"
"He fell through some scaffolding."
"What was he doing?"
"They were hanging him."

One day during war, a tall, strong and handsome Roman soldier broke into a house where he found two lucious maidens and their matronly nurse.

Chuckling with glee, he roared, "Prepare thyselves for a conquest, my pretties."

The lovely girls fell to their knees and pleaded with him, "Do with us as thou wilt, O Roman, but spare our faithful old nurse."

"Shut your mouth," snapped the nurse, "War is war."

An African explorer reports that beasts in the jungle won't harm you if you carry a torch, provided you carry it fast enough.

"I'm going to spread some manure over the lower 40," the farmer casually mentioned to his wife at breakfast.

Soon as he'd left the room, his daughter—just back from finishing school—pleaded with her mother, "Can't you get Dad to say 'fertilizer' instead of that perfectly horrid word 'manure'?"

"No," replied mother. "I'm leaving well enough alone. You should have heard what he said before I taught him to say 'manure'."

← Enter 14 on card, page 257

How progressive Indiana quarry has kept pace with rising production demands . . .

4-yard Tractor Shovel slices semi & tandem load time 75%

Original problem: Too-slow loaders

Like many quarries, Meshberger Stone Company, Columbus, Indiana, used to handle stockpile loading with power shovels and bucket loaders. Worked okay . . . *until* 1955 when the company started selling more grades of stone. Then—because these rigs couldn't move fast—*or* load fast—production suffered. Trucks were delayed, output goals unattained.

Two-year solution: Greater loading speed

Into this situation moved a rubber-tired Tractor Shovel—with the same advantages owner Leon Meshberger found had already helped some 20 other nearby quarries. The new machine was a 2¼ yd Michigan Model 175A. *It cut load time in half*—two minutes for a typical 9 ton truck. And, by traveling between stockpiles at high speeds, it virtually eliminated truck waiting time.

Today's solution: Still more speed

The 2¼ Michigan served Meshberger well until last year when the picture changed again. On one hand, demand went up so much, plant capacity was increased. Two, fleet owners had found it cheaper to haul in bigger

haul units. Again Meshberger sought a way to cut load time. His move was a natural one: to a still larger Michigan . . . this then-newly-introduced 4 yard Model 275A.

4 yards per pass

Loading capacity of this new Michigan has proved all that was expected—and more! Fifteen ton tandems now need only 3 passes, 45 to 90 seconds, to load. Twenty-two ton semis are heaped in only 4 to 5 passes, 2 minutes. Load time is two-thirds that of the Model 175A . . . one-fourth that of bucket loaders!

Material: ag lime to 6″ stone

Loading of all 15 crushed grades is ably handled by the 262 hp Model 275A: from ag lime (above) to 6″ stone—over 400 tons an hour. In readily-heaping powdery lime, bucket loads often weigh 8 tons each. In coarse stone they average 5½ tons each.

Loads small trucks effectively, too

Material goes into many different kinds of haulers, pickups to trailers. The 4 yard Model 275A handles them all. On smaller sizes, like this 6 ton dump truck, Michigan operator Verne Fawbush merely lets bucket extend over rear of truck bed toward stockpile. This way, most of the excess material from the one or two passes falls back on the stockpile; balance is cleaned by one quick swipe of the bucket.

"Good job" in shot rock

At times, the 4 yd Michigan helps out in the pit. Power, size, and reach are ample to feed the 15 ton rock wagons. Despite absence of rock bucket, unit does "good dependable job" lifting the heavy, jagged ledge material and carrying it over rough footing to the trucks.

The future:

Speed and capacity of his 4-yd Model 275A Michigan "should handle our expansion for years to come," forecasts Mr. Meshberger. But should things boom unexpectedly, the next step is here! Michigan's biggest model —*the 6 yard 375A*—is already being used in many pits! Could its 6 yard (or the 275A's 4 yard) "bites" help solve your production problems?

Michigan is a registered trade-mark of

CLARK EQUIPMENT

CLARK EQUIPMENT COMPANY
Construction Machinery Division
2479 Pipestone Road
Benton Harbor 11, Michigan
In Canada: Canadian Clark, Ltd., St. Thomas, Ontario

Enter 16 on card, page 257

Michigan Dozer operator has excellent view of blade.

High-speed Michigan Dozer expands

Nevada firm reduces handling costs 25%

Nacon Company, Inc is a Las Vegas firm that *doesn't* take chances when buying equipment. "Gambling belongs in the casinos!" says Tom Stewart, president of Nacon. "Before *we* lay out $50,000 or so for any big dozer, we *demand* on-the-job demonstrations.

"Our latest demonstration really proved profitable. In the hopes of boosting crusher-feed production, we tried a rubber-tired Michigan Dozer. The output of this rig really surprised us. Tests showed the 375 hp Model 380 could push enough material to our crusher to produce 400 tons of spec stone per hour—*even at distances up to 400 feet*. No competitively-priced rig came close to this production. We talked it over with our Michigan Distributor, Graid Equipment Company . . . and bought!"

The Michigan's first job was on a 9-mile excavating-grading-structures section of new four-lane blacktop Federal Interstate Highway near Las Vegas. Here, Nacon's contract called for several hundred thousand tons of roadway base and sub-base gravel (3,250 lb/yd) in three grades—select bankrun, #1 and #2 stone. Michigan's share was to dig out and push all this material to the crusher. It did . . . at an *average* work speed of 3 to 7 mph!

Production up 20 to 30%

Output averaged 400 tons per hour . . . 20 to 30% higher than Nacon's estimates with other machines . . . at a per-ton cost "about 25% lower." And since the high-speed Michigan could economically work longer distances, Nacon didn't have to move the crusher as often as with crawler-feeding. One set-up handles as much as 315,000 tons.

Bud Jacobsen, operator of the Model 380, likes the Michigan for more reasons than high production. "For one thing, it's easier riding," says Bud. "Tires absorb bumps and ruts so you can work faster on rough going. Second, you sit higher . . . have a better view of blade and of ledge and hopper edges. Third, Michigan handles easier . . . you change speeds and direction simply by moving little hydraulic levers *and without foot-clutching*. Its ease of handling, plus greater speed, adds up to *greater production than any crawler at any distance over 50 ft!*"

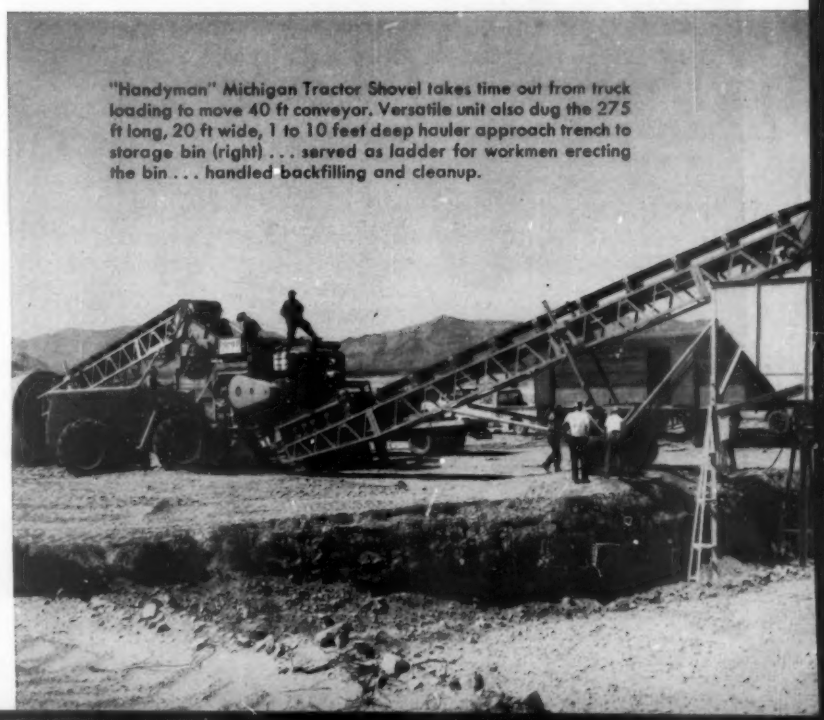
Michigan Tractor Shovel loads 20 yd trucks in 2½ minutes

But the Model 380 Dozer isn't the only Michigan drawing praise around Nacon's crushing set-up. A 2¾ yd Model 175A Tractor Shovel is attracting attention as

practical crusher feed distance to 400′

it handles stockpile loading. This unit heaps a typical 20 ton truck in only 5 passes, 2½ minutes . . . a typical 20 ton bottom-dump hauler in 4 passes, 2 minutes.

Output like this, day in and day out, speaks well of Nacon's job planning . . . also proves Michigans have what it takes to speed dozing and loading. See for yourself! Pick the rubber-tired Michigan Dozer you want to see, 162, 262, 375, or 600 hp . . . or the Michigan Tractor Shovel, 16 cubic feet to 6 cubic yards (standard SAE-rated capacity) . . . then ask your Michigan Distributor for a demonstration.



"Handyman" Michigan Tractor Shovel takes time out from truck loading to move 40 ft conveyor. Versatile unit also dug the 275 ft long, 20 ft wide, 1 to 10 feet deep hauler approach trench to storage bin (right) . . . served as ladder for workmen erecting the bin . . . handled backfilling and cleanup.

Michigan is a registered trademark of

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Construction Machinery Division

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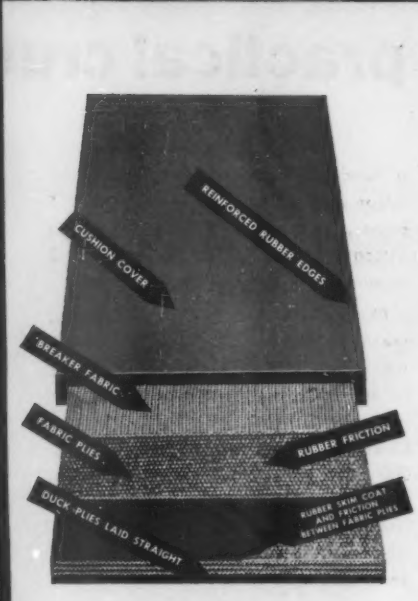
Enter 18 on card, page 257

Going up --- new highways, bridges and buildings

300 tph of aggregate goes up on the Acme-Hamilton conveyor belt to the concrete mixing plant . . . and from there to the hundreds of construction jobs served by the Parkway Concrete Co., Trenton, N. J. "This Barber-Greene Conveyor and Acme-Hamilton belt have given me better service than any other I have used" says Frank Talarowski Parkway's general manager.

BETTER SERVICE at lower cost is assured when you make sure your belting is Acme-Hamilton. Whatever your conveying problem, A-H can solve it with a proven belt from its complete line, that will do a "Custom built" job for you. For a complete explanation of A-H belt construction and types, write for our "check-your-belt" Catalog.



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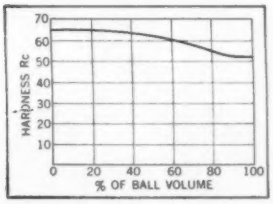

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Quarry performance like this is standard with REICHdrill. Why? Because:

- ... all-hydraulic top-drive rotary provides infinitely variable speed of drill rotation – the right speed for every formation.
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REICHdrill has built a reputation for keeping maintenance costs low; footage records high.

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T-650 truck-mounted REICHdrill operating in a quarry. Hole size: to 7⅞"; down pressure: 30,000 pounds. Other models available, truck or crawler mounted, with hole size to 16 inches, down pressure to 90,000 pounds.

News of the Industry

Three Changes Announced In Top Management Of American Cement Co.

Garner A. Beckett, formerly chairman of the board of directors of American Cement Corporation, has been elected honorary chairman of the board. Allen L. Chickering Jr. has been elected chairman of the board, succeeding Mr. Beckett.

At the same time, James P. Giles Jr., president of Hercules Cement Company, a division of American, was elected executive vice-president of the latter.

Mr. Beckett has been active in the cement industry since 1921, when he joined Riverside Cement Company. He was elected president of Riverside in 1936 and held that position until the end of 1957, when Riverside became a division of American. At that time, he was elected chairman of the board of the new parent company.

Mr. Chickering is a member of the San Francisco law firm of Chickering & Gregory. He was a director of Riverside before its merger; he is also a director of Leslie Salt Company.

Mr. Giles joined Hercules in 1951 as assistant to the president, and succeeded through a number of promotions to the presidency of Hercules in 1958. He is also a director and a member of the executive committee of American.

J-M Communication Network To Save $200,000 Annually

A high-speed teletype communications system has been installed by the Johns-Manville Corporation, connecting 69 plants, mines, and offices in the United States and Canada.

Heart of the teletype network is a message center in New York which is directly connected with all points on the 11,000-mile leased wire system. It is estimated that up to 340,000 words a day can be sent over the system, saving J-M about $200,000 annually in communication costs.

New Concern Formed in N.Y. To Make Lightweight Material

Hudson Valley Lightweight Aggregate Corporation is a newly organized $1,000,000 firm in New York (state) which will produce lightweight aggregate for masonry units and structural concrete. Production facilities will be located on a 135-acre site purchased from the Washburn Brick Company, Glasco, N. Y. (no longer operated).

One of the principals in the new firm is the Solite Corporation of Richmond, Va., producer of lightweight aggregate since 1947. Previously there had been no large lightweight aggregate source in the area.

Production to Start Soon At Pryor, Okla., Plant Of Oklahoma Cement Co.

Although the $8,000,000 plant of Oklahoma Cement Company at Pryor, Okla., has not been completed, stockpiling of raw materials began some time ago. According to D. E. Baxter, secretary-treasurer, the quarry has been cleared, and shakedown operations have begun.

Production of cement is expected to begin about June 15 at the rate of about 3,000 bbl. per day.

Kaiser Gypsum Company has exercised its option to buy 34 acres of property in Jacksonville, Fla., as a site for a multimillion-dollar gypsum products plant. Purchase price was approximately $150,000.

Coming Events

July 7, 8, 1960—Dearborn, Mich. Midyear meeting, Expanded Clay and Shale Association. Dearborn Inn.

July 17-20, 1960 — Kiamesha Lake, N.Y. Midyear meeting, National Bituminous Concrete Association. Concord Hotel.

July 20-23, 1960—White Sulphur Springs, W. Va. Midyear meeting, N.C.S.A. board of directors. The Greenbrier.

September 29-30, October 1, 1960—Chicago. Fall Operators' Meeting, National Lime Association. Conrad Hilton Hotel.

October 3-5, 1960—Pebble Beach, Calif. Semi-annual meeting, National Sand and Gravel Association board of directors. Del Monte Lodge.

October 10-13, 1960 — Las Vegas, Nev. Metal Mining and Industrial Minerals Convention Exposition, American Mining Congress.

October 17-21, 1960—Chicago. 48th Annual National Safety Congress, National Safety Council.

November 3-4, 1960—Washington, D. C. Annual meeting, National Slag Association, Hotel Mayflower.

April Building Awards Top $3 Billion Mark— 2nd-Highest April Total

April future construction contracts in the United States (excluding Alaska and Hawaii) totaled $3,359,782,000—down 11 percent from the same month last year. This was the ninth consecutive month showing a drop in award totals, compared to the same months in 1959. However, F. W. Dodge Corporation noted, in announcing the figures, that since it was the second-highest April ever recorded, and that on a seasonally adjusted basis, it was the highest for any month in history, a decline from the peak is hardly alarming. On this latter basis, April showed a substantial increase over March, and an even greater increase over February.

Contracts slipped in every major category of residential and non-residential building, more than offsetting increases in heavy engineering. These were the chief factors behind the April decline. The Dodge seasonally adjusted index (1947-49=100) has risen from 234 in February to 252 in March and 266 in April.

ITEM: housing contracts amounted to $1,479,529,000 — down 19 percent from April, 1959. This represented the bulk of the decline in dollars.

ITEM: heavy engineering contracts amounted to $832,502,000—up 9 percent, but principally because of three large pipeline contracts.

ITEM: non-residential building contracts totaled $1,047,751,000—down 12 percent.

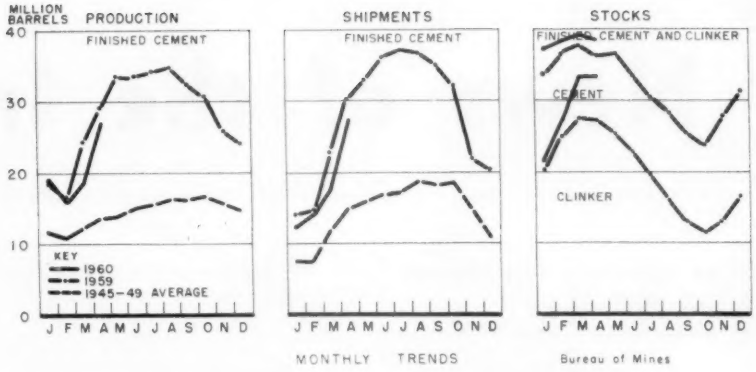
CUMULATIVE TOTALS for the first four months of 1960 and the percentage changes from the corresponding period of last year: total construction, down 8 percent to $10,806,053,000; housing, down 14 percent to $4,676,544,000; non-residential building, down less than 0.5 percent to $3,598,534,000; and heavy engineering, down 4 percent to $2,530,975,000.

The Lone Star Cement Corporation plant at Lake Charles, La., has received a safety award in the form of a concrete monument awarded by the Portland Cement Association. The plant had no lost-time accidents in the last calendar year. R. R. McBride, superintendent of the plant, accepted the safety trophy.

The time and place of the Fall Operators' Meeting of the National Lime Association have been set. Sessions will be held at the Conrad Hilton Hotel, Chicago, on September 29 and 30 and October 1.

The following changes in titles of National Sand and Gravel Association staff members were announced after the annual meeting of the association's board of directors: Vincent P. Ahearn, formerly executive secretary, is now managing director; Kenneth E. Tobin Jr., formerly associate executive secretary, becomes associate managing director.

Construction is nearly finished on a new $1,000,000 finish grinding department at the Speed (Ind.) plant of Louisville Portland Cement Company. The department consists of an Allis-Chalmers 10- by 34-ft. dry-grinding two-compartment mill (the first of its type at the plant) operating in closed circuit with a separator and cooler. System capacity is 180 bbl. per hour.



—April, 1960, Finished Portland Cement—

SUMMARY—Production of finished portland cement in April, 1960, as reported to the U. S. Bureau of Mines, totaled 27,015,000 barrels—a decrease of 7 percent compared with April, 1959. Mill shipments totaled 27,341,000 barrels—a decrease of 9 percent, compared with April, 1959. Stocks of 38,542,000 barrels of finished portland cement on hand April 30, 1960, were 6 percent higher than those on hand April 30, 1959. Clinker production during April, 1960, totaled 27,165,000 barrels—a decrease of 7 percent compared with April, 1959.

PRODUCTION—One hundred and sixty-nine plants in 37 states and Puerto Rico reported a production of 27,015,000 barrels of finished portland cement during April, 1960, compared with 29,093,000 barrels produced in April, 1959.

Production of clinker was 27,165,000 barrels, compared with 29,087,000 barrels during April, 1959.

High-early-strength portland cement totaled 1,120,000 barrels—a decrease of 1 percent, compared with the April, 1959, production.

Prepared masonry cement production of 1,492,000 barrels decreased 8 percent from the April, 1959, figure.

SHIPMENTS—Mill shipments of finished portland cement for April, 1960, were reported by 171 plants and totaled 27,341,000 barrels—compared with 30,135,000 barrels in April, 1959.

Shipments were higher in four districts and lower in 19.

Mill shipments of high-early-strength portland cement totaled 1,269,000 barrels—a decrease of 7 percent from the 1,371,000 barrels shipped in April, 1959.

Mill shipments of prepared masonry cement totaled 1,498,000 barrels—a decrease of 7 percent from the 1,607,000 barrels shipped in April, 1959. Prepared masonry cements are shown in 376-lb. barrels, although sold in barrels of varying weights.

STOCKS—Mill stocks of 38,542,000 barrels of finished portland cement were on hand April 30, 1960—an increase of 6 percent over the 36,378,000 barrels on hand April 30, 1959. Stocks of clinker on hand April 30, 1960, totaled 33,545,000 barrels—an increase of 22 percent over the 27,544,000 barrels on hand April 30, 1959.

FIRST FOUR MONTHS OF 1960—For the January-April period, the volume of production of finished cement amounted to 80,186,000 barrels, compared with 88,744,000 barrels in Jan.-April, 1959. Total shipments for the first four months of 1960 are reported at 72,364,000 barrels; in the same period of 1959 total shipments were 82,363,000 barrels. (Shipment figures do not include finished cement used in the manufacture of prepared masonry cement, as follows: April, 1959—288,000 barrels; January-April, 1959—813,000 barrels; April, 1960—297,000 barrels; January-April, 1960—693,000 barrels.) ●

Enter 25 on card, page 257 →

AGAIN!

IT'S EAGLE SAND WASHING EQUIPMENT FOR SUPERIOR STONE CO.

DIVISION OF AMERICAN-MARIETTA CO.

The Eagle Sand Washing—Classifying—Dehydrating Section at the Woodleaf, N. C. plant of Superior Stone, shown above, is their latest addition of Eagle Equipment. They are producing an asphalt sand from screenings in their quarry which has about 7 to 7½% minus 200 mesh. No mineral additives are necessary.

The Eagle section consisting of a 32′ Water Scalping—Classifying Tank and a 44′ x 32′ Single Screw Fine Material Unit, does an excellent job of economically washing, classifying and dehydrating this material, at the same time retaining the highly desirable fines.

Their first Eagle section, below at left, installed in 1957, is shown at the Superior Stone, New Bern, N. C. plant. Their second installation made early in 1959 at the McLeansville, N. C. plant is shown below at right. These plants also produce manufactured sand, the Eagle equipment aiding in retaining the needed fines.

When you install Eagle Equipment you get more than just machinery—you get the benefit of Eagle's experience which goes way back to the very beginning of sand washing—you get service that is available to you for the entire life of your Eagle equipment—you get sound recommendations based on integrity. (SEND FOR COMPLETE FACTS IN CATALOG 58.)

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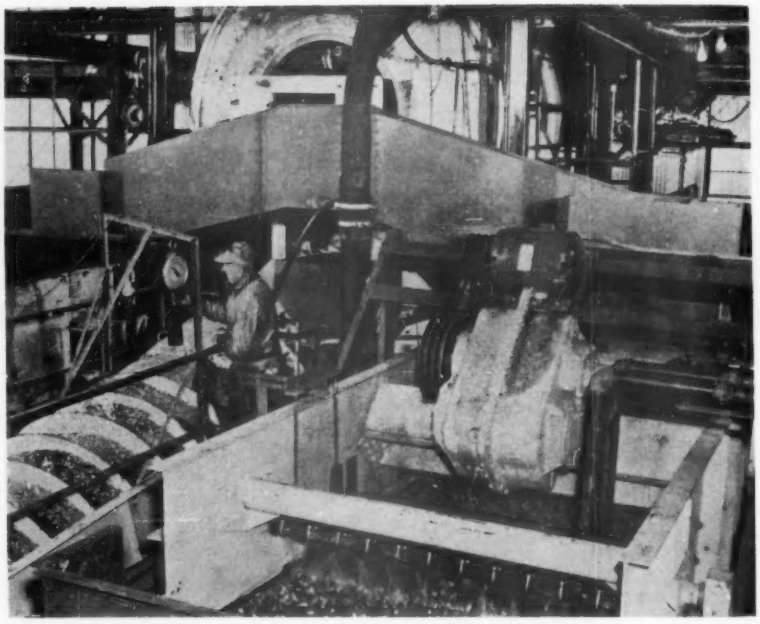
Marquette Acquires Sites For Plants in Four States As Cement Demand Grows

Marquette Cement Manufacturing Company has purchased extensive raw material deposits at Glen Haven, Wis., and Austin, Tex., for future plant sites, and acquisition of a similar deposit near Albany, Ga., is under negotiation. The latter will be Marquette's second major plant in Georgia. Property for a distributing plant at St. Paul, Minn., has also been purchased.

Cement producing and distributing facilities will be built at these locations as soon as rising demand provides economic justification for the individual developments. The newly purchased Glen Haven and St. Paul properties will be developed when demands on surrounding Marquette plants increase sufficiently to necessitate their withdrawal from the marketing area near the new sites.

At that time a cement producing plant will be constructed at Glen Haven and a distributing plant will be built at St. Paul. Both sites are on the Mississippi River.

Major producing units are also projected for the future at the Austin, Tex., and southern Georgia sites, it was indicated.



● To meet the growing demand for high-grade, natural aggregates, American Aggregates Corporation recently put into production its second heavy-media-separation installation in Michigan at its Oxford plant. The production of this facility and American Aggregate's plant at Green Oak, (Brighton) Mich., brings the firm's total capacity in H.M.S. beneficiated material in these areas to 600 t.p.h. The Green Oak plant was placed in production in 1954. These two installations are considered the largest aggregate beneficiation plants in the nation.

The heavy media used to separate the aggregates consists of a mixture of water, ferrosilicon, and magnetite. Separation takes place in a 12-ft. diameter, 10-ft. long revolving steel drum. The equipment for the Oxford beneficiation plant was supplied by Western Machinery Corporation, San Francisco. Installation was done by American Aggregates personnel, who also erected the structures housing the equipment.

The photo above shows the 12-ft. diameter separator drum, upper rear, which discharges material into two conveyors and washers, left and right. A spiral densifier is shown in the foreground. The operator is checking the specific gravity of the H.M.S. medium.

Passing of C. E. Ireland Closes Brilliant Career

C. Eugene Ireland, one of the founders of the Birmingham Slag Company, Birmingham, Ala., and a pioneer in the aggregates industry, died on May 2, 1960.

C. Eugene Ireland

At the age of 30 years, Mr. Ireland went from Middlepoint, Ohio, to Birmingham (in 1916) to manage the Birmingham Slag Company, then a small local operation. Throughout the years of this firm's development Mr. Ireland served as sales manager, vice-president, general manager, president, and finally chairman of the board. He retired in October, 1956, three months before Birmingham Slag became a part of Vulcan Materials Co.

Dates for the 16th annual convention of the National Limestone Institute, Inc., have been announced by Robert M. Koch, president. The sessions will be held January 17, 18, and 19, 1961, at the Statler-Hilton Hotel in Washington, D. C. The board of directors will meet on January 16.

Lime Plant Project Studied By National Gypsum Company

National Gypsum Company management is conducting market studies in the Detroit, Chicago, and Lorain-Cleveland areas to determine the feasibility of constructing large lime plants to serve steel plants.

The company is acquiring a large tract in the vicinity of Toronto, Ontario, where plans are being made to construct a multimillion-dollar gypsum products plant and mine "at some time in the future."

Although the precise location was not disclosed, National has had extensive drilling operations conducted near Brantford, Ont.

It was stated that construction of the three lime plants will depend on the results of the market studies, including the anticipated needs of the steel industry in the three areas. Sales of lime produced by National now approximate $15,000,000 a year.

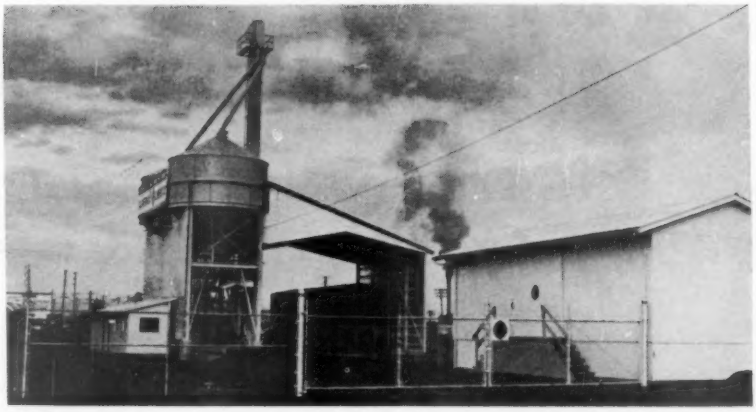
Construction Put in Place Rises 10 Percent in May But Still Below '59 Rate

The value of new construction put in place in May amounted to $4.5 billion, according to preliminary estimates of the U.S. Department of Commerce. This figure is 10 percent above April (about the normal increase) but 5 percent less than the total in May, 1959.

ITEMS: Private construction, estimated at $3.2 billion, was up 8 percent from April, but 4 percent less than in May, 1959. Residential increased 8 percent from April—slightly less than the usual seasonal rise, causing the seasonally adjusted annual rate to decline slightly.

ITEMS: Public construction, estimated at $1.4 billion, was up 15 percent from April, 1960, but down 7 percent from May, 1959. The only major changes in the May, 1960, seasonally adjusted annual rate of construction expenditures were for public non-residential buildings, which increased nearly 5 percent, and for military construction, which declined about 15 percent.

CUMULATIVE TOTALS: The cumulative value of construction expenditures in the five months amounted to $19.6 billion—2 percent below the comparable 1959 level. The seasonally adjusted annual rate of total new construction expenditures is now $53.9 billion—about the same as the April estimated rate. The cumulative value of private residential construction in the first five months was $7.7 billion—6 percent less than in the comparable period of 1959. For nearly all of the remaining categories of private construction, except farm construction, cumulative expenditures in the first five months were substantially ahead of their comparable 1959 totals. The cumulative value of expenditures for public construction in the first five months amounted to $5.4 billion—11 percent less than in the same period of 1959.



● This is the Calaveras Cement Company's new bulk cement transfer plant in Springfield, Oreg., from which 13 counties in southern Oregon will be supplied. The facility has a capacity of 2,350 bbl. of bulk cement and four carloads of sack cement. Its 70-ft. scales permit loading of one bulk cement truck and trailer every seven minutes. Bulk cement is supplied to the plant by rail from the Calaveras manufacturing plant at San Adreas, Calif. Next year, when the firm's $14,000,000 plant at Redding, Calif., goes into production, bulk cement will be shipped from this point to the Springfield transfer facility.

Merged Ohio Aggregates Firms Join Central States Constr.

Four firms in the Canton, Ohio, area—Stark Sand and Gravel Company, Canton Sand and Gravel Company, Lake Cable Sand and Gravel Company, and United Sand and Gravel Company—have been merged under the name of Canton Aggregate Company. Management and operation of all facilities has been taken over by Central States Construction Company, Willmar, Minn.

The firm sponsoring the new concern is made up of Central States Construction Co., New London Materials and Construction Company, and Willmar Ready-Mix Company.

Lime Production in March, 1960

Lime sold and used in March, 1960—1,067,715 short tons—increased over the previous month's output, according to reports sent by producers to the Bureau of Mines, U. S. Department of the Interior.

Increases were noted in all major categories.

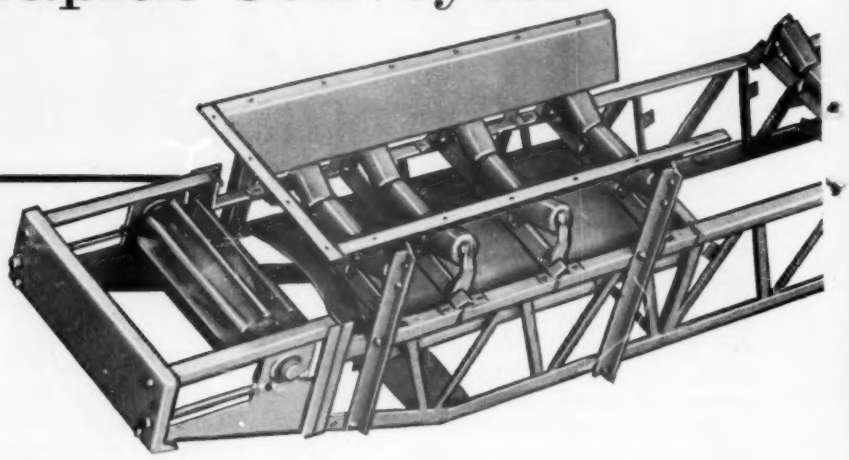
Lime Sold and Used by Producers* in the United States, in Specified Periods of 1959-60, by Types and Major Uses in Short Tons

	February	March		January-March	
	1960	1960	1959	1960	1959
By types:					
Quicklime	787,733	847,061	674,366	2,411,983	1,819,450
Hydrated lime	194,165	220,654	173,184	611,289	444,176
Total lime	981,898	1,067,715	847,550	3,023,272	2,263,626
By uses:					
Agricultural:					
Quicklime	2,213	2,297	8,308	6,708	14,412
Hydrated lime	5,446	8,785	15,579	18,401	27,152
Total	7,659	11,082	23,887	25,109	41,564
Construction:					
Quicklime	6,189	6,892	12,367	19,685	34,340
Hydrated lime	60,806	66,240	76,278	188,349	191,608
Total	66,995	73,132	88,645	208,034	225,948
Chemical and other industrial:					
Quicklime	556,147	609,578	429,822	1,705,172	1,159,640
Hydrated lime	127,913	145,629	81,327	404,539	225,416
Total	684,060	755,207	511,149	2,109,711	1,385,056
Refractory (dead-burned dolomite)	223,184	228,294	223,869	680,418	611,058

*The monthly canvass excludes the output of plants producing less than 10,000 tons a year.

STRIGID*

is the word for new-design Cedarapids Conveyors



Strong, Rigid construction is the prime requirement for a conveyor system that helps maintain a profitable operating pace and reduces your material handling costs. New-designed Cedarapids Lattice Frame Conveyors are engineered for strength and rigidity . . . they're "Strigid!"

What is the first thing to look for when you buy conveyors?

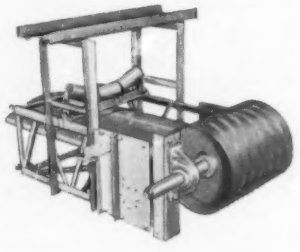
Design and construction features that insure moving more tons at lowest cost per ton.

And that's what you find when you look critically at the new "strigid" design of Cedarapids Conveyors!

Strong construction is a must for handling today's increasing hourly tonnages. Cedarapids' rugged truss design, with diagonal angle-steel side bracing the full depth of the truss, gives extra strength without extra weight; permits longer spans between supports with no sacrifice of stability. End frames are reinforced at each corner with gusset plates and securely fastened with 4-bolt connections to resist distortion from external stress. One of the many Cedarapids extra-strength design features is the wide use of clamp-on, hook-on mountings to eliminate bolt holes which tend to weaken the conveyor structure.

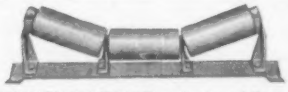
Rigid stability is another result of Cedarapids' "strigid" construction. Rectangular end frames between sections, reinforced with gusset plates, give added rigidity to joints. Frames are engineered for rigid, structural stability to support the load without weaving or buckling. Lateral cross bracing between side members assures extra resistance to wind sway.

True alignment is assured by pre-engineered "strigid" construction. Components are built on special fixtures and jigs, and jig-welded for the perfect alignment that comes with structural strength and rigidity. Truly accurate alignment simplifies training the belt and increases belt and roll life.



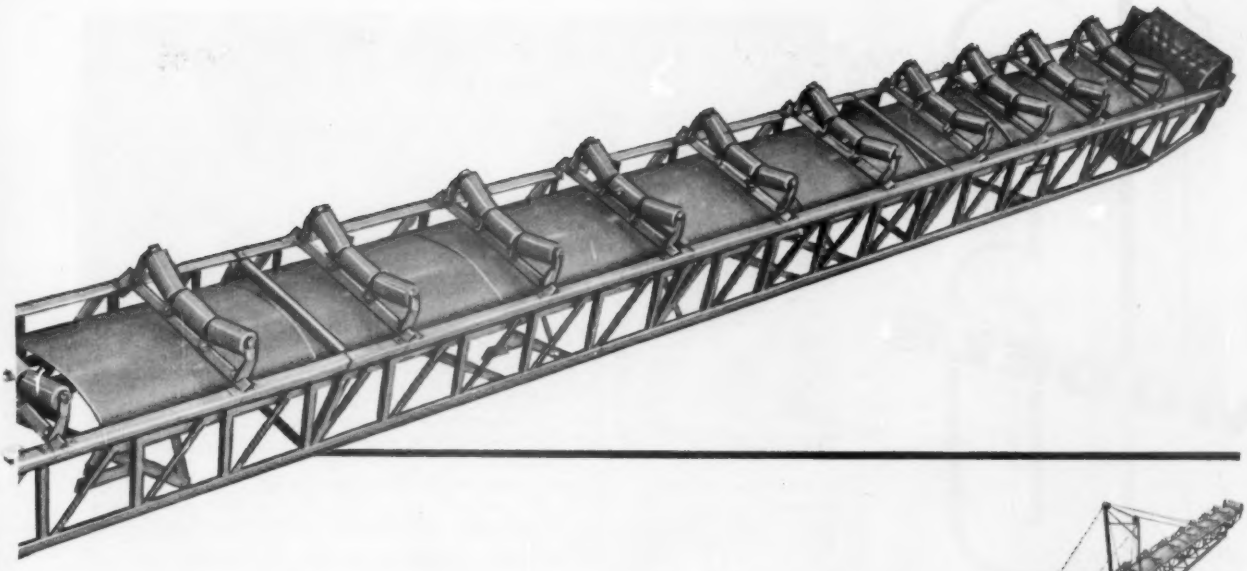
JIG-WELDED HEAD SECTIONS, box or taper styles, ruggedly designed for strength without increased weight. Wide-faced, crowned head pulleys are reinforced with extra discs for added strength. Carborundum-coated Safety-Grip Lagging reduces slippage and requires less belt tension.

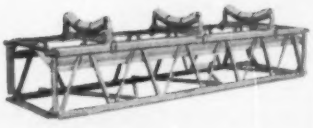
Modular design means greater convenience, greater savings for you. Standardized, interchangeable conveyor components are pre-engineered at the factory for job-engineered erection that is fast, easy, and low cost. Order your modular components "off the shelf." They arrive on the job pre-fit for perfect alignment. There's no cost or delay for special engineering, special drawings or calculations. It is simple to order just what you need for your job, tailored to your requirements. And modular components cost less... our quantity production savings are passed on to you.



TROUGHING ROLLS and return idlers are made by Cedarapids for the absolute quality control that insures uniformity, perfect balance and maximum strength. Life-Seal ball bearings are permanently lubricated and sealed at the factory. Clamp-on mounting allows easy adjustment for belt training and for altering the standard 4' spacing to handle special applications.

Adaptability is another important savings benefit. Additional modular





INTERMEDIATE SECTIONS are jig-welded for true alignment. Rugged truss design permits longer spans between supports with no sacrifice of rigidity. 8', 10' and 12' sections available to adapt conveyors to any needed length in 2' increments.

conveyor components are always available from stock, ready for immediate delivery. You can extend or alter your conveyor system in the field with minimum time and cost. Add clamp-on troughing rolls to handle greater loads when necessary. Head and tail sections accommodate a useful range of shaft, bearing and pulley sizes without structural alteration.

Cedarapids "Strigid" Conveyors are pre-engineered to cover a wide range of applications, handling light or heavy materials horizontally or on an incline, with belt widths from 18" to 36", in any even foot length. Components are designed for fastest, easiest erection and quick field alterations to meet changing needs.

Start saving material handling money today. Your Cedarapids Dealer can give you a quick quotation for prompt delivery of your Cedarapids "Strigid" Conveyor.

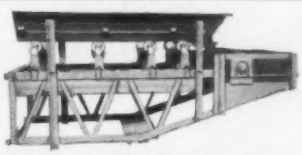
CEDARAPIDS portable lattice frame conveyors are engineered with the same strong, rigid design as "strigid" stationary conveyors. Cable method of erection saves on maintenance. A self-locking independent hand or electric winch adjusts conveyor to any height up to 22°. Cedarapids Strigid portables are available in 18", 24", 30" and 36" widths, in lengths up to 70 ft.

SEND FOR THESE NEW BULLETINS

Cedarapids "Strigid" Conveyors incorporate so many new design features it takes a 16 page bulletin to describe all their money-saving, profit-making details. When you send for your copy of Conveyor Bulletin CON-2, be sure to ask for the new Conveyor Selection Manual containing necessary tables and charts and listing lengths, widths, drives, horsepower and all other data you need to select your tailor-made conveyor components "off the shelf."

IOWA MANUFACTURING COMPANY

Cedar Rapids, Iowa



JIG-WELDED TAIL SECTIONS, in both taper and box styles, are interchangeable. Clamp-on hopper framework eliminates bolt holes to maintain structural strength. Self-cleaning wing type tail pulleys feature the same quickly detachable hubs used in the head pulleys.

Cedarapids — Built by IOWA

IOWA MANUFACTURING COMPANY
Cedar Rapids, Iowa

Gentlemen: Please send Bulletin CON-2 with details about Cedarapids new-design Strigid Conveyors. Also send the Conveyor Selection Manual.

Name_____

Company_____

Address_____

City_____ State_____

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Specify the **MODEL**
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Choose from 16 Models of FULLER Three-Speed Auxiliaries

FULLER MANUFACTURING COMPANY
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Subsidiary EATON Manufacturing Company

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• Ideal Cement Company has commissioned the SS KEVA IDEAL, a self-unloading vessel with a capacity of 80,000 bbl. (15,000 tons) of bulk cement. The KEVA is rated as the largest cement carrier afloat under the American flag. She is also equipped to carry and unload 13,000 tons of limestone or gypsum.

Originally a T-3 tanker, the KEVA was converted by the Alabama Dry Dock and Shipbuilding Company in Mobile. Design agents were Pillsbury and Martignoni, San Francisco.

The specifications of the KEVA are as follows: length, 501 ft.; beam, 68 ft.; depth, 37 ft.; draft, 28 ft.; loading rate, 2,000 bbl. of bulk cement per hour; unloading rate, 4,000 bbl. per hour (by means of a drag scraper system and pumps); service speed, 15 knots; power, 7,000 shaft hp. from two turbines geared to a single propeller.

Hogberg, Adams Speakers At Michigan A.I.M.E. Session

At the spring technical session of Michigan's Upper Peninsula section of the American Institute of Mining, Metallurgical and Petroleum Engineers held recently in Houghton, Mich., members heard addresses delivered by Carl Hogberg, president of Michigan Limestone Division (U.S. Steel Corporation), and Charles M. Adams, vice-president, operations, Huron Portland Cement Company.

Mr. Hogberg discussed *Some Aspects of the Limestone Industry in Michigan*. He stated that Michigan was the third-largest limestone producer in the United States in 1957. Mr. Adams, who covered cement production in Michigan, predicted that this state's output will be doubled by 1975. At present Michigan's seven cement facilities have a combined annual output of 33,000,000 bbl.

Hawaiian Cement's New Plant At Barber's Pt. Nearly Finished

Spokesmen for the Hawaiian Cement Corporation have announced that the firm's $12,000,000 plant near Barber's Point on Oahu (now under construction) will be producing cement in the immediate future. Quarrying operations have begun on the 533-acre quarry site. Initial capacity is expected to be 1,000,000 bbl. annually, and the facility can be expanded later to produce 3,000,000 bbl. per year.

The new installation, located on a 27-acre site, will have 19 silos; crushing, grinding, burning, and homogenizing facilities; a packing plant; an administration building; and laboratories.

Hawaiian Dredging & Construction Company, Ltd., and the Bechtel Corporation are the joint builders of the plant.

Need Reclamation Pointers? Here's One from U.S.D.A. Book

According to a U.S. Department of Agriculture handbook—*Forestation on Strip-Mined Land in the Central States*—one of the best ways to reclaim waste earth after land has been worked out is to plant trees on it.

This manual lists 20 species of trees which can be planted successfully on such land. It is available at 36 cents a copy from the Superintendent of Documents, U.S. Government Printing Office, Washington 25, D.C.

COLORADO Concrete Aggregate Plant

C. Ryan & Son aggregate plant near Climax, Colorado

Telsmith Super-Scrubber, Vibro-King Finishing Screen, and Sand Classifier, and Gravel Rewgsher over steel bins

Feeder, Rotary Grizzly and 15x38 Jaw Crusher

Scalping Screen, and Gyrasphere Secondary Crusher

G-31

TELSMITH designed and equipped

The C. Ryan & Son aggregate plant, near Climax, Colorado, makes three sizes—minus 1½" plus 7/16", minus 7/16" plus ¼", and minus ¼" sand. This *complete Telsmith plant* has a capacity of 100 tons or more per hour and its products are used to make concrete aggregate for large industrial companies. Let Telsmith engineer your plant for big capacity, product flexibility, and low-cost efficient operation. Send for Bulletin 266.

TELSMITH EQUIPMENT IN THIS PLANT

30" x 5'6" Heavy Duty Plate Feeder • No. 450 Rotary Grizzly • 15 x 38 Roller Bearing Jaw Crusher • 3' x 10' Single Deck Vibro-King Scalper • 36-S Gyrasphere Secondary Crusher • 72" x 10' Super-Scrubber • 4' x 10' Double Deck Vibro-King Finishing Screen • 20" x 13' Twin Screw Rewasher • 24" x 19' Single Screw Sand Classifier • Three (3) Belt Conveyors.

SMITH ENGINEERING WORKS

504 E. CAPITOL DRIVE **MILWAUKEE 1, WISCONSIN**

Representatives in Principal Cities in All Parts of the World • Cable Address: Sengworks, Milwaukee

A.I.E.E. Cement Industry Group

Holds Second Technical Conference

Members of the executive committee of the A.I.E.E. cement industry sub-committee include V. G. Murdock (Allis-Chalmers Mfg. Co.). W. G. Lefferts (Allis-Chalmers Mfg. Co.)(W. A. Allan (Universal Atlas Cement), J. F. Hower (Lehigh Portland Cement), A. H. Huelsman (General Electric Co.), and H. P. Cassell (Whitehall Cement Mfg. Co.). Mr. Hower succeeds Mr. Allan as general chairman of the executive committee. Mr. Murdock headed the program committee.

THE second cement industry technical conference of the American Institute of Electrical Engineers held at the Hotel Pfister, Milwaukee, Wis., May 17-19, was attended by approximately 300 key operating men and top technical personnel representing virtually every major cement company and the equipment suppliers serving the industry.

Headed by Walter A. Allan (project development supervisor, Universal Atlas Cement Div., U.S. Steel Corp.), general chairman, the A.I.E.E. cement industry sub-committee set up a 5-part program for the three-day session. The final phase of the program involved plant tours of Harnischfeger Corporation; Nordberg Manufacturing Company; Marquette Cement Manufacturing Company; Universal Atlas Cement Div., U.S. Steel Corporation; and Allis-Chalmers Manufacturing Company. At a banquet closing the formal part of the program, C. C. Van Zandt (executive vice-president in charge of operations and engineering, Lone Star Cement Corp.) was the featured speaker.

Papers delivered during the two-day general sessions were grouped into the following categories: maintenance and safety; automation; drives and related products; and power distribution.

Maintenance and Safety J. A. Allen (St. Lawrence Cement Company) was moderator for the section devoted to maintenance and safety. Papers presented were *Electrical Maintenance in Cement Plants,* by R. C. White (Macdonald Engineering Company); and *Some Practices to Improve Electrical Safety in Cement Plants,* by H. P. Cassel (Whitehall Cement Mfg. Company).

Automation The section on automation was moderated by A. H. Huelsman (General Electric Company). *A Review of Automatic Sampling—What Has Been Done to Obtain Truly Representative Samples,* was a study prepared by R. J. Jager (Lone Star Cement Corp.), and J. A. Mitchell (Portland Cement Association). *Some Fundamental Concepts of Regulating Circuits as applied to the Cement Industry* was co-authored by J. H. Rittenhouse (Penn-Dixie Cement Corp.), and A. K. Raney (General Electric).

Two Riverside Cement Company men, L. W. Weeks, and R. L. Boulden, prepared a discussion on *The 1960 Status of the Riverside Computer Installation.* B. E. Kester (Missouri Portland Cement Co.), G. B. Moore (Southwestern Portland Cement Co.), and W. F. Loranger (General Electric) prepared a paper reviewing *Developments in X-ray Chemical Controls in the Cement Manufacturing Process During 1959 and 1960.* J. A. Herz (California Portland Cement Co.), discussed *Process Instruments as an Aid to Automating Cement Plants;* and Mr. Kester described *The Use of a Magnetic Flowmeter for Automatic Metering of Slurries.*

Drives, Related Products Moderator of the section on drives and related products was W. G. Lefferts (Allis-Chalmers Mfg. Co.) *Requirements for Cement Plant Overhead Storage Cranes from a User's Standpoint,* and *Selection of Electrical Equipment for Cement Plant Storage Cranes* were subjects presented in papers prepared by L. E. Swanson (Peerless Cement Div., American Cement Corp.), and A. A. Rutkowski (Harnischfeger Corp.), respectively.

J. B. Woodward and R. H. Striker (W. R. Bendy Cement Engineers) reviewed *Typical Accuracies Required for Adjustable Speed Feeders in the Cement Industry.* Another paper on feeders—*Comparison of Basic Drive Types for Adjustable Speed Feeders in Cement Plants*—was presented by T. Offrell and P. G. Duell (F. L. Smidth & Co.). C. E. Roberts (Westinghouse Electric Corp.) discussed *Preliminary Suggested Recommendations for Electric Drives in the Cement Industry.*

Distribution G. E. Macdonald (Medusa Portland Cement Co.) moderated the session on power distribution. *Preliminary Suggested Recommendations for Cement Plant Power Distribution* were noted by A. C. Lordi (Westinghouse Electric Corp.). *Typical Application Considerations for Cable in Cement Plants* was a presentation co-authored by W. A. Browne (Uni-

(Continued on page 37)

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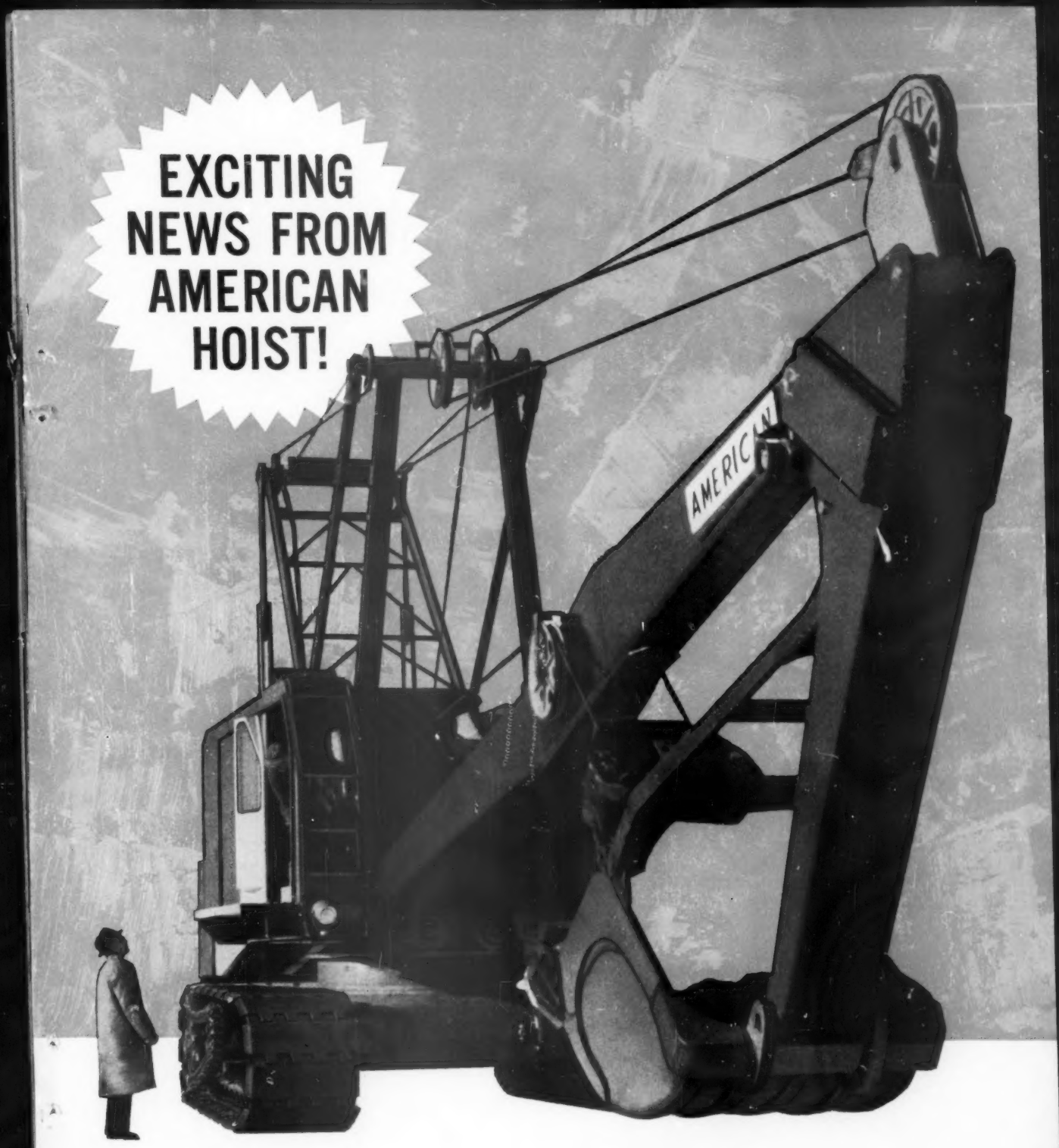
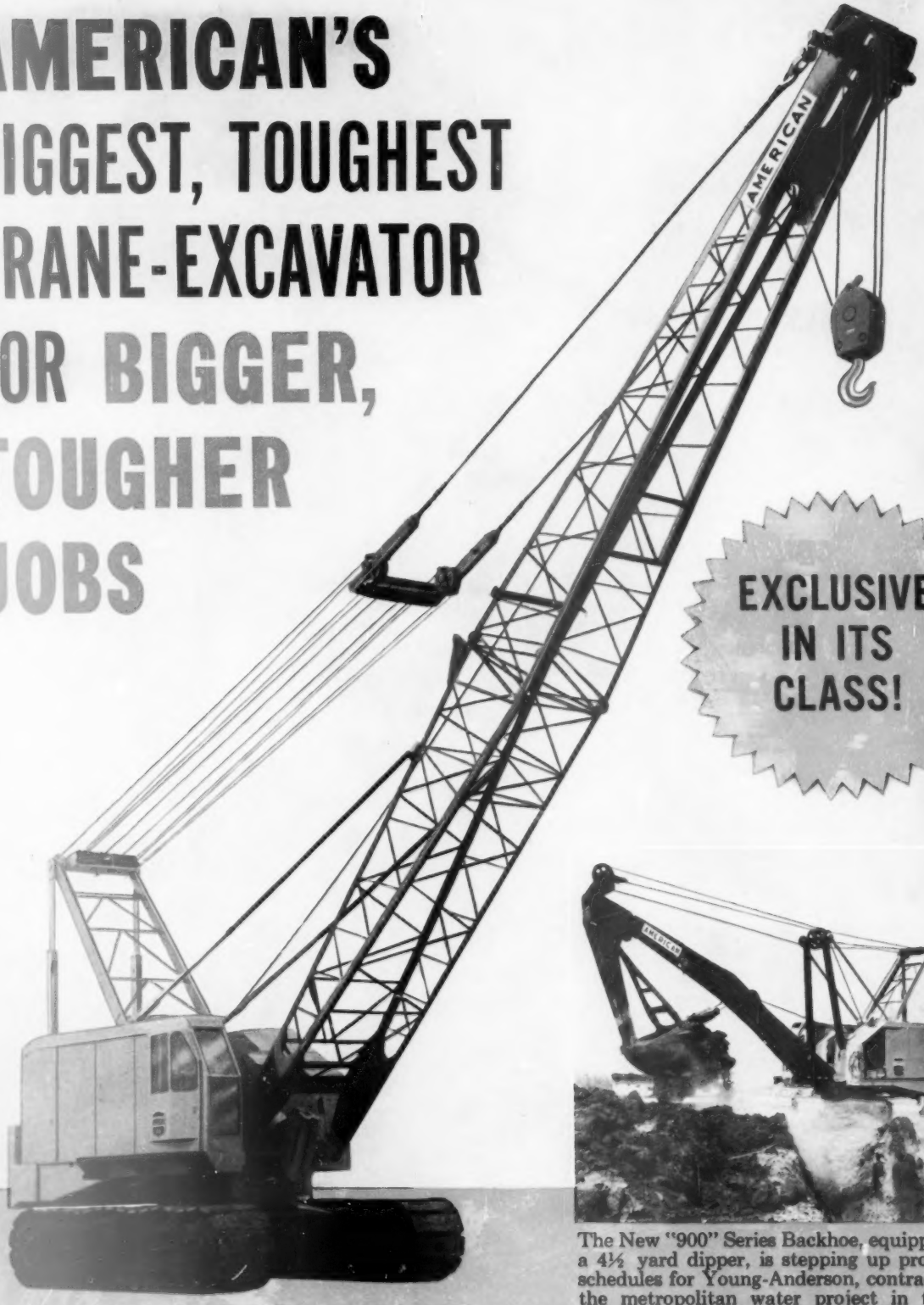


AMERICAN CONTINUES TO LEAD THE EQUIPMENT FIELD

NEW "900" SERIES CRANE-EXCAVATOR

3½ - 4½ Yards / 110 Ton Capacity

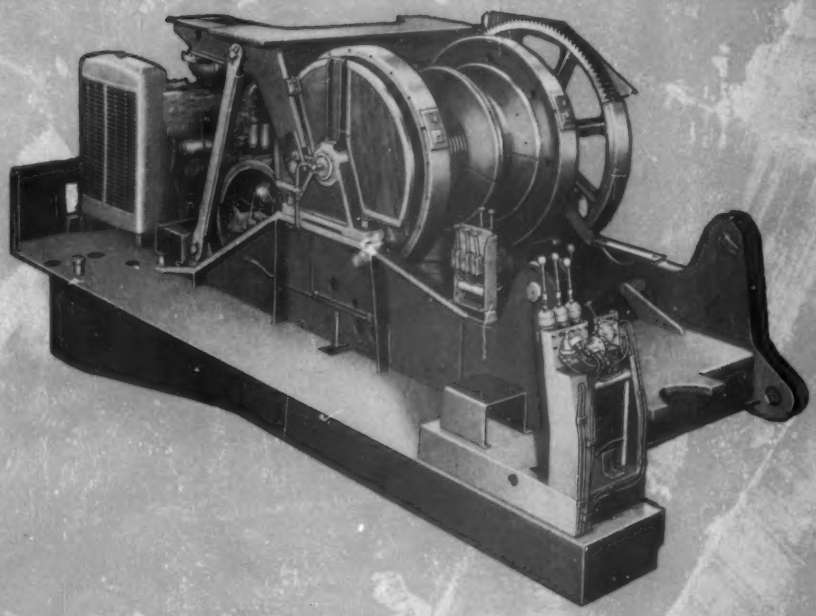
AMERICAN'S BIGGEST, TOUGHEST CRANE-EXCAVATOR FOR BIGGER, TOUGHER JOBS



EXCLUSIVE IN ITS CLASS!

The New "900" Series Backhoe, equipped with a 4½ yard dipper, is stepping up production schedules for Young-Anderson, contractors on the metropolitan water project in the San Francisco-Oakland Bay area.

Engineered from tracks to boom tip to withstand severest shock and strain.
American builds 'em better . . . so you can finish faster.



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Jig Bored, Drilled and Machined . . . Perfect Alignment of Shafts, Drums, Gears and Bearings

Oversize Brakes and Clutches

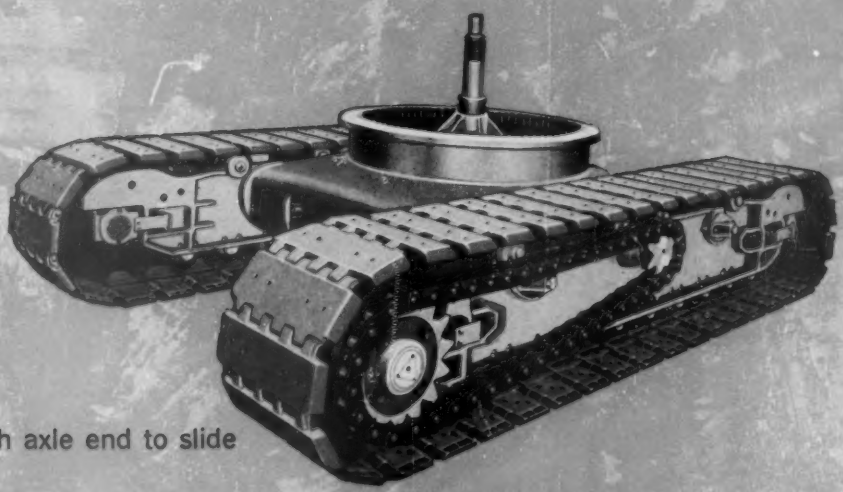
All Drum and Shaft Assemblies Individually Removable

Look at these outstanding "900" features!

Deeper, More Rugged Single Piece Carbody, Cast Alloy Steel

Full 18" Ground Clearance

Easiest Machine to Ship for its Size:



Remove only one bolt at each axle end to slide off side frames.

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AMERICAN'S FAMOUS JOB-PROVEN, JOB-PROFIT FEATURES!

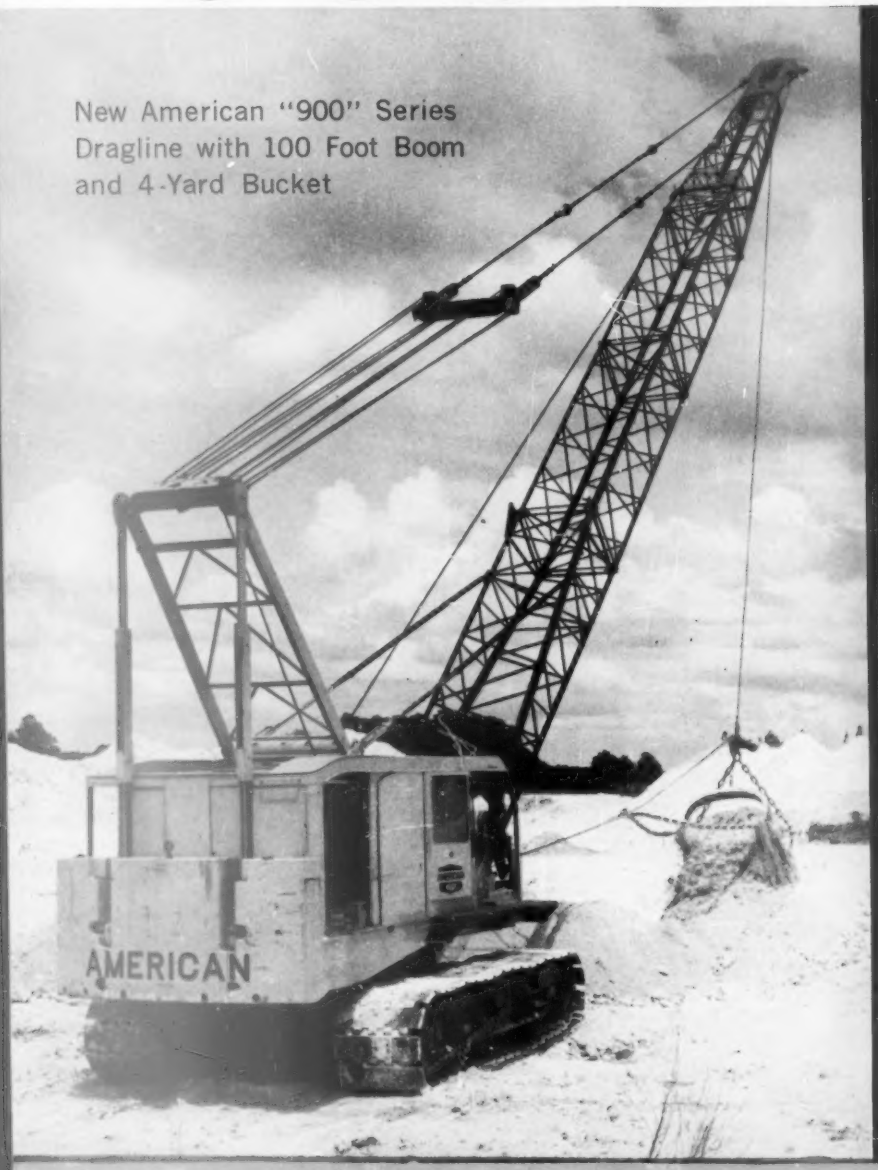
Tandem Band Clutches . . . Anti-Friction Bearings on Constantly Rotating Shafts and Drums . . . Smoothest Operating Boom Hoist in the Business Ultimate in Swing Smoothness . . . Graduated Air Controls

"900"

AMERICAN "900" SERIES

Built For . . .

LONGER REACH
BIGGER LOADS
GREATER PRODUCTION



New American "900" Series Dragline with 100 Foot Boom and 4-Yard Bucket

3 Crane Booms

Up to 270′ in length, plus jib.

Designed for high reach steel erection and long boom dragline work

3½ Yd. Shovel or Backhoe

Other capacities and various sizes to fit specific requirements.

Get all the extra money-making details on the Industry's Newest Crane-Excavator . . . NOW!

AMERICAN HOIST
and Derrick Company
St. Paul 7, Minnesota

Excavators-Cranes
to 4½ yds, 110 tons

Derricks-Hoists
to 800 tons

Crosby-Laughlin Division
Forged fittings for wire rope-chain

Engineered Products Division
Specialized Materials Handling Equipment

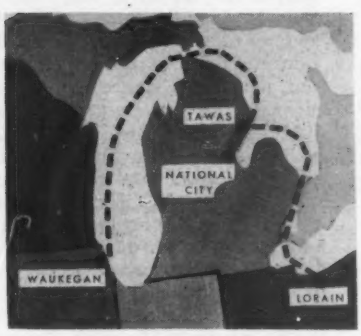
Locomotive Cranes
to 130 tons

Revolver Cranes
to 400 tons

Printed in USA

National Gypsum's Network On Great Lakes Completed With Start of Lorain Plant

Completion of the $25,000,000 Great Lakes production network of National Gypsum Company was marked on June 8 with ceremonies



With the activation of National Gypsum's Lorain plant, the firm's four-point system of Great Lakes gypsum facilities is now complete.

at Lorain, Ohio, site of the firm's newest gypsum plant.

Vital key to the entire network is the mother deposit of gypsum near Tawas City, Mich. The Great Lakes undertaking was made possible by the discovery six years ago by National Gypsum geologists of a 100,000,000-ton deposit of top quality gypsum. This discovery meant that the mineral could be transported at low cost by lake vessels to plants near the Milwaukee-Chicago and Greater Cleveland markets. It also guaranteed an ample supply of ore for the National City, Mich., operation.

Another important factor in facilitating the project was the completion of the St. Lawrence Seaway, which supplied a tremendous spurt to economic growth in the Great Lakes area.

The only part of the chain not involving water transport is the distance between Tawas City and National City in Michigan, over which gypsum is shipped by rail.

Isn't It Funny?

The idea isn't new—you've heard and read it before. But, as rendered in a recent issue of the New York Trap Rock Corporation's publication *Screenings*, the theme has a fresh, insistent message.

When the other fellow takes a long time to do something, he's slow. But when I take a long time to do something, I'M THOROUGH.

When the other fellow doesn't do it, he's too lazy. When I don't do it, I'M TOO BUSY.

When the other fellow does something that pleases the boss, he's polishing the brass. But when I do something that pleases the boss, THAT'S CO-OPERATION.

When the other fellow gets ahead, he sure had the lucky breaks. But when I manage to get ahead—Man! HARD WORK DID THAT!

Funny, isn't it?

A.I.E.E. Cement Industry Conference

(Continued from page 32)

versal Atlas) and D. L. Watkins (American Steel & Wire). *Typical Installation Practices for Cable in Cement Plants* were described by G. I. Burner (Aetna Standard Div., Blaw-Knox Co.), and *Typical Application and Installation practices for Cables and Overhead Lines in Cement Plant Quarries* were jointly reviewed by W. A. Reynolds (Huron Portland Cement) and W. T. Walker (Simplex Cable Co.). *Interesting Features of the Electrical Equipment in Marquette's Milwaukee Plant* were described by G. H. Ember (Marquette Cement Mfg. Co.).

All of the above technical papers were bound in a single brochure, and copies were distributed to registrants at the meeting. (These papers may also be obtained by contacting the treasurer of A.I.E.E. Milwaukee Section, 3112 W. Highland Blvd., Milwaukee 8, Wis. Price, $7.50).

J. F. Hower (chief electrical engineer, Lehigh Portland Cement Co., Allentown, Pa.) is the group's new general chairman, succeeding W. A. Allen. The 1961 technical conference will be held in Detroit.

At a site near Hendersonville, N. C., the J. L. Colville Construction Company is opening a quarry and installing facilities for the processing of stone meeting specifications of the North Carolina Highway and Public Works Commission. Equipment for the plant will be installed at a cost of $700,000. Headquarters of the firm will be moved from Bryson City to Hendersonville.

TO THE
QUARRIES
WHO USE
SPRINKLING EQUIPMENT
FOR DUST CONTROL
WE OFFER OUR
STEVENS' EVER-WETTER

▶ To effectively agglomerate and settle dust from stone crushing operations, before it becomes airborne.

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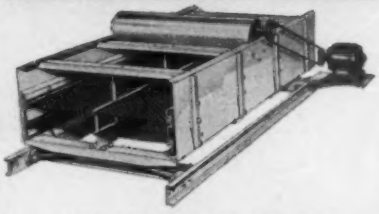

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Racine, Wisconsin
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1 SKOOPER puts lime rock loading on a profitable basis

FLORIDA — Stockpiled lime rock was a real loading problem until this company put a Skooper on the job. A track mounted front end loader was tried first. Production was good but the cost of maintenance was astronomical; crawlers cut out in about six months. A rubber tired front end loader failed to provide adequate production; this machine spun wheels in an effort to get a full bucket. The Skooper rewrote all previous production records, loading out 350 tons of rock per hour. Even at this rate, the Skooper had to wait for truck in many instances.

15-yard truck loaded out every 3 minutes

TEXAS — Loading packed caliche out of stockpile, Skooper heaped 15-yard trucks in about three minutes. That's five yards a minute with an excavator which is basically a ½-yard machine!

400 tons an hour with only 64 horsepower

OHIO — On highway construction, Koehring 205 Skooper was clocked loading loose borrow into trucks. Time studies showed a production rate of 400 tons an hour for the 64 h.p. machine equipped with 2½-yard rehandling bucket!

2 Keeps production high at sand and gravel plant

UTAH — Loading pit-run material at a Utah sand and gravel plant, Skooper's continuous production dig-swing-dump cycles let operator load trucks at top efficiency all day long. No late-afternoon drop-off, common with front-end tractor loaders. Skooper power is concentrated on digging effort, not on traveling.

3 Canadian producer heaps 5-yard trucks in 2 swings

ONTARIO—With contract to supply aggregates to city for street improvements, Canadian sand and gravel company stationed Skooper at stockpile. 5-yard trucks were heaped to capacity, and on their way in just 2 scoops and 2 fast swings of the 2½-yard rehandling bucket! Soon as one truck pulled out, next truck spotted in on opposite side. No waste motion. Skooper just kept swinging from "stand-still" position—loaded out to either side with equal ease, speed and efficiency. 7-foot level crowd action, plus high bucket reach, saves unnecessary crawler movement. Nothing like it on wheels or tracks!

4 Steady diet of foundry sand

ILLINOIS — Skooper owner has long-term contract to supply used foundry sand from industrial plant

.....FIELD REPORTS PROVE *there's*

KOEHRING

Enter 38 on card, page 257

yard. He sells it to other contractors for use as subgrade material on parking lots, roads, etc. Skooper replaced a tractor front-end loader on this work. Owner reports Skooper not only compares favorably production-wise with the old machine, but maintenance and fuel costs are substantially lower! It's an ideal high-production application for full-revolving, free-swinging Skooper. Plenty of reach for loading the big, high-sided trailers, too! Clearance height under roll-over bucket is 12'-10" at beginning of dump — and more than 10 ft. after dumping.

5 Strips gravel deposit then loads it out

OHIO — Opening new gravel pit, operator teamed a Koehring Skooper with Koehring 8-ton Dumptors — a cost-cutting combination. During initial stripping, big, wide Skooper bucket easily handled large rocks and stump-strewn overburden with no material hang-up during discharge. Then its smooth 7-foot level crowd stripped off remaining overburden fast, clean, in flat, level cuts — exposed underlying gravel deposits with minimum mixing of materials. And the sand and gravel? Skooper loaded that out, too — heaped the 8-ton Dumptor in just a few passes.

Money-saving excavator-crane convertibility

For all its big-bucket versatility, Skooper is by no means a single-purpose tool! Base machine is the job-proved Koehring 205. Entire front end of the Skooper is removed as a complete unit when converting to any one of the alternate attachments: ½-yard shovel, hoe, ½ to ¾-yard clamshell, dragline, 10-ton lift crane. Alert Skooper owners are cashing in on this extra time and money-saving advantage. Saves buying or renting additional equipment.

Mail now to:
KOEHRING DIVISION,
3026 W. Concordia, Milwaukee 16, Wis.

Send new Skooper catalog right away.

NAME.....

TITLE.....

COMPANY.....

DIVISION.....

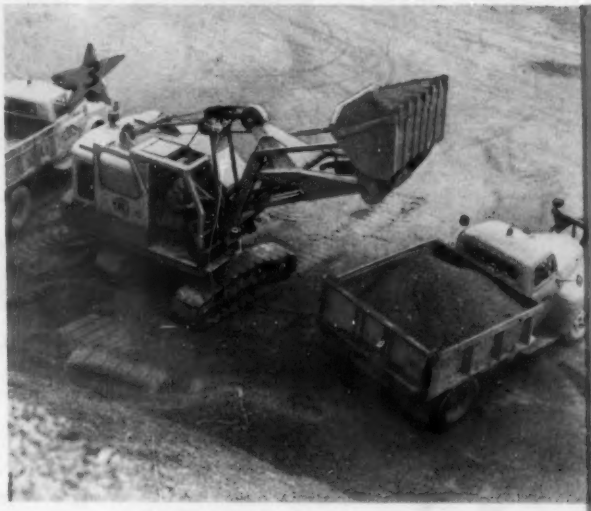
STREET.....

CITY, STATE.....

Digging, stripping, loading, rehandling — Koehring® Skooper has proved itself on one job after another — from coast to coast, and overseas, too. Isn't it about time you checked what it will do for you? Better call Koehring distributor, or write us today.

KOEHRING
DIVISION OF KOEHRING COMPANY
Milwaukee 16, Wisconsin

nothing like it — on wheels or tracks!



SKOOPER

KOEHRING HEAVY DUTY

Lehigh Scholarships Awarded To Two Outstanding Students

Because the qualifications of two candidates for the Lehigh Portland Cement Company's annual scholarship were balanced so evenly, the National Merit Scholarship Corporation announced that two awards —instead of the one originally planned—would be made.

The two young people, Susan G. Rose and Alexander J. Brincko Jr., were among the 9,800 finalists competing in examinations; from this group 1,000 were selected for scholarships. (A total of 500,000 high school students took the examination.) The fathers of both winners are Lehigh employees.

At Rockmart, Ga., the official opening of Marquette Cement Manufacturing Company's modernized plant was marked recently by an open house. Guests from points throughout the state and surrounding states inspected the facilities with which cement is produced at the rate of 1,250,000 bbl. annually.

What Is Success?

It is being able to carry money without spending it; being able to bear an injustice without retaliating; being able to do one's duty even when one is not watched; being able to keep on the job until it is finished; being able to accept criticism without letting it whip you.

—Lehigh News Conveyor

Permanente's Newest Cement Developed for Special Uses

A new cement specially formulated for the concrete block and products industries has been introduced by Permanente Cement Co.

The new Permanente product is light in color; and tests conducted according to A.S.T.M. codes, as well as those under manufacturing conditions, have determined that it achieves strength rapidly and has satisfactory workability.

Permanente's new cement is available in bulk or sack in all West Coast markets and is priced at the same level as standard cement.

Development of the new product coincides with a major Permanente promotion drive aimed at popularizing concrete block.

A.I.M.E. to Send Three To World Geological Meeting

The American Institute of Mining, Metallurgical, and Petroleum Engineers will have three representatives at the International Geological Congress in Copenhagen, August 15-25, 1960.

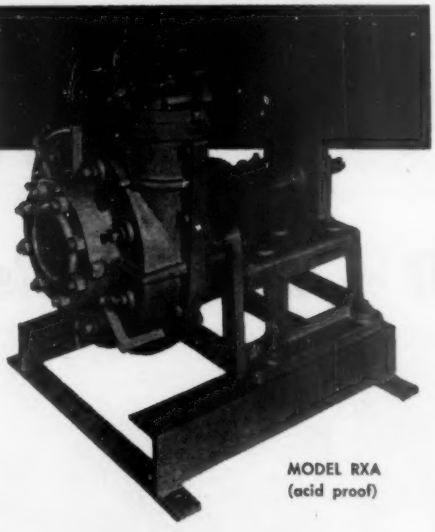
Dr. Joseph L. Gillson, of Wilmington, Del., will represent the institute itself. Dr. Gillson is president of A.I.M.E. and is former president of the American Geological Institute, and of the Society of Economic Geologists.

Dr. Charles M. Behre Jr., of New York, professor of economic geology at Columbia University, will represent the Council of Education of A.I.M.E.

Dr. Richard M. Foose, of Menlo Park, Calif., chairman of the Department of earth sciences, Stanford University, will represent the Mining and Exploration Division of the Society of Mining Engineers.

NEW!

PERFORMANCE-PROVED CERAMIC-LINED SAND PUMP



MODEL RXA (acid proof)

ARE YOU USING pumps for transferring fines? Is the volume in the range of 110′ head-150 GPM to 70′ head-600 GPM?

ARE YOU TIRED of replacing impellers, liners, shells, sleeves, seals, bearings, shafts, bolts, nuts, gaskets, etc., every few months?

ARE YOU WISHING someone would produce a pump worthy of your expectations? Something that would hold up for say — 14 months? 18 months? 2 years!

YOU WILL FIND the ultimate in wear resistance in ceramic lined pumps using silicon nitride bonded silicon carbide wear parts.

SOUND EXPENSIVE? Not at all. Cost is comparable to alloyed iron or rubber lined pumps.

For additional information on the new MODEL RXA Ceramic-Lined Sand Pump, write:

The KANSAS CITY HAY PRESS COMPANY

801 Woodswether Road Kansas City 6, Missouri

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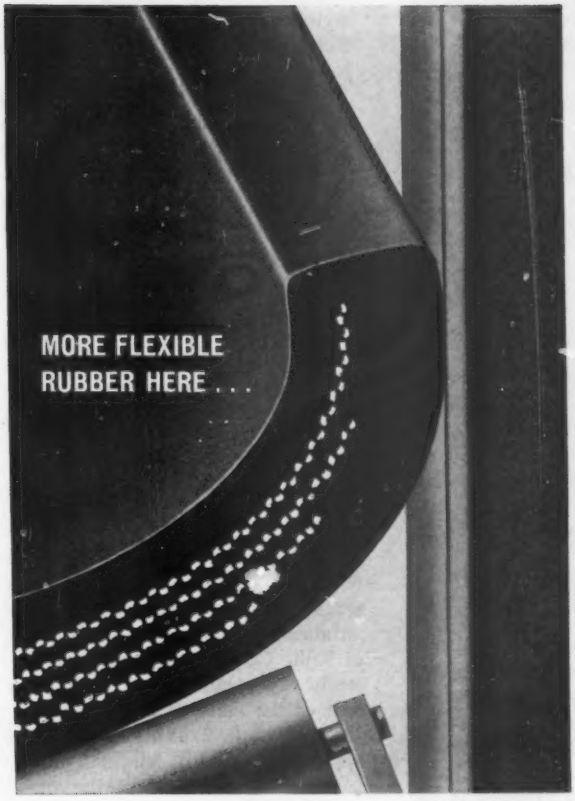
Quaker Thermoid

"COLEDGE" BELTING REDUCES EDGE WEAR, ADDS MILES OF USE!



Improper training can ruin a conveyor belt faster than any other abuse. Riding up and rubbing against a frame member soon wears away the stiff edge of conventional belting and exposes the carcass plys to moisture, mildew, dirt and eventual ply separation. "Coledge" belt construction was developed by Thermoid Division—to overcome this weakness and extend belt life.

"Coledge" construction puts plenty of extra rubber on the edges where it counts most . . . the plys are stepped back to make a more flexible edge that rides with the punches when misalignment occurs. This "Coledge" construction can put many extra miles on your system, especially in coal fields and sand and gravel pits where most belt failures are the result of excessive edge wear. Exclusive with Thermoid Division, "Coledge" construction is available in any standard type belt your application may require.

So, if you have an edge-wear problem with conveyor belts, specify "Coledge" construction. See your Thermoid Division industrial distributor for technical data or assistance, or write *Thermoid Division, H. K. Porter Company, Inc., 200 Whitehead Road, Trenton 6, New Jersey.*

THERMOID DIVISION PORTER **H. K. PORTER COMPANY, INC.**

PORTER SERVES INDUSTRY with steel, rubber and friction products, asbestos textiles, high voltage electrical equipment, electrical wire and cable, wiring systems, motors, fans, blowers, specialty alloys, paints, refractories, tools, forgings and pipe fittings, roll formings and stampings, wire rope and strand.

A New Development in Open Gear Lubrication

PLASTIGEAR 815

OPEN GEARS RACKING DIPPER STICKS

Extremely adhesive, non-melting waterproof and high film strength. Stable at all temperatures—will not drip off with heat or chip off with cold.

We believe Plastigear 815 is the best open gear or dipper stick lubricant manufactured to date. No solvents or pre-heating—use as is!

Want proof? Sample and information will be furnished on request.

THE WARREN REFINING & CHEMICAL CO.
CLEVELAND 2, OHIO

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REPLACE WITH
INDIAN BRAND

Get the most out of your present equipment. When you need replacements, remember we started in 1913 to build our reputation in the Manganese Steel field for dependability plus economy.

Insist on INDIAN BRAND MANGANESE STEEL

Shovel Dippers • Dipper Teeth
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Mantles • Concaves
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Grate Bars • Breaker Plates
Ball Mill Liners • Screen Plates
Misc. Manganese Steel Castings

THE FROG, SWITCH AND MANUFACTURING COMPANY
Carlisle, Pennsylvania • Established 1881

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Industry Personalities

CLIFTON A. PRATT has been named manager of the Hillsville, Pa., operation of Michigan Limestone, a division of the United States Steel Corporation. He was formerly manager of the Cedarville, Mich., operation.

C. A. Pratt

W. R. Ransom

WILLIAM R. RANSOM, who has been assistant to the Northern District manager, will replace Mr. Pratt as manager at Cedarville.

S. JAMES CAMPBELL, treasurer of Harry T. Campbell Sons' Corporation, has been re-elected chairman of the board of directors of the Associated Builders and Contractors, Inc. He is a past-president, and the first person to serve three terms in this office. A.B.C. is a trade association composed of 670 firms in the contracting field.

JOHN P. HOLT has joined the Valley Dolomite Corporation staff as director of research and development, and will have headquarters in St. Louis, Mo. This is a new position, created to serve the firm's product lines in the basic refractories industry. Mr. Holt was previously manager of market development at Basic, Incorporated, Cleveland, Ohio, and before that superintendent of melting at the Midvale Company, Philadelphia.

NORMAN C. LUDWIG, research associate at the Universal Atlas Cement Division's laboratories, Buffington (Gary), Ind., has been appointed manager, manufacturing research, in the Raw Materials and Manufacturing Division. In his new capacity, he will have headquarters at the Buffington location. This is a newly created position of the U. S. Steel Corporation subsidiary.

WILLIAM V. FRIEDLAENDER, also research associate at the Buffington laboratories, has been advanced to the post of manager, products development and quality analyst, in the Quality and Technical Services Division, New York City.

LEE ROGERS is the new president of Arsenal Sand and Gravel Company, New Brighton, Minn., succeeding the late FRANK JANES. JOHN D. MCCREERY has been named vice-president and general manager.

A. CABELL FORD JR. has been appointed North Carolina sales representative for Carolina Solite Corporation, a wholly-owned subsidiary of Solite Corporation. He was formerly representative in the eastern part of the state.

LINWOOD F. PERKINS JR. has been appointed western Virginia representative for Solite Corporation.

JAMES C. CROUDACE has been named plant manager of the Newark gypsum plant of Fibreboard Paper Products Corporation.

ROBERT L. ALLGOOD has been appointed superintendent of Kaiser Gypsum Company's Antioch, Calif., gypsum products plant. He was formerly superintendent of the company's gypsum products plant at Seattle.

JOHN O. LEWIS, who was previously plant superintendent at the Kaiser gypsum plant in Antioch, Calif., will succeed Mr. Allgood as superintendent at the Seattle gypsum products plant.

PAUL DUNCAN has been named treasurer of the Marquette Cement Manufacturing Company. Mr. Duncan had been a vice-president and a director for several years.

C M. Krueger

CARL M. KRUEGER has been named director of public relations for the Peerless Cement Company, Detroit, Mich.

He had been associated with the Julius Porath & Son Company, Detroit, from 1942 until 1960, having served as vice-president and general manager. He is a past-president of the Michigan Road Builders Association.

THOMAS R. AVANT has been promoted to the post of manager of the new Midwest Sales Division of the National Gypsum Company. His territory includes the Denver, Kansas City, Minneapolis, Omaha, and St. Louis districts. Mr. Avant was formerly manager of the Kansas City District.

FRANK W. DOUGLAS, a retired member of the sales staff of Lehigh Portland Cement Company, recently observed his 100th birthday anniversary. When he retired in 1931, he was manager of the New Jersey district. He served Lehigh for 12 years, and had been associated with the cement industry for 55 years.

DAVID W. WATSON, president of the Hamilton Gravel Company, Hamilton, Ohio, has been named chairman of the safety council's 1960 associate membership campaign in that city.

JAMES H. THOMAS has been named plant superintendent of the West Sand and Gravel Company, Inc., Richmond, Va. He has been with the company since 1957, having previously served as a safety engineer for Travellers Insurance Company.

SIDE DUMPS
for ROCK, EARTH, ORE

PAN ▸ TYPE
truck bodies and trailers
14 to 45 TONS
dumped by EASTON electric overhead hoist

◂ DROP DOOR
truck bodies and trailers
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pan type and drop door
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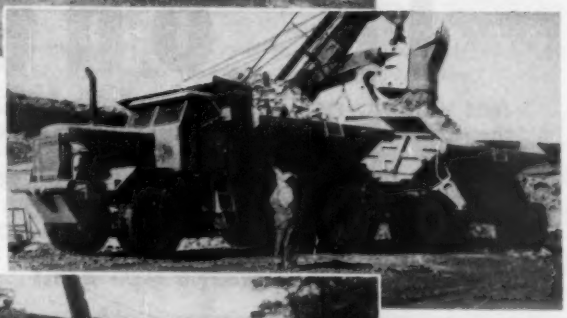

Variable Wheel Base
◂ REAR DUMPS
capacities 22 and 35 TONS

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EASTON CAR & CONSTRUCTION COMPANY • EASTON, PA.

★★★★★★★★★

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B-1084

EASTON®

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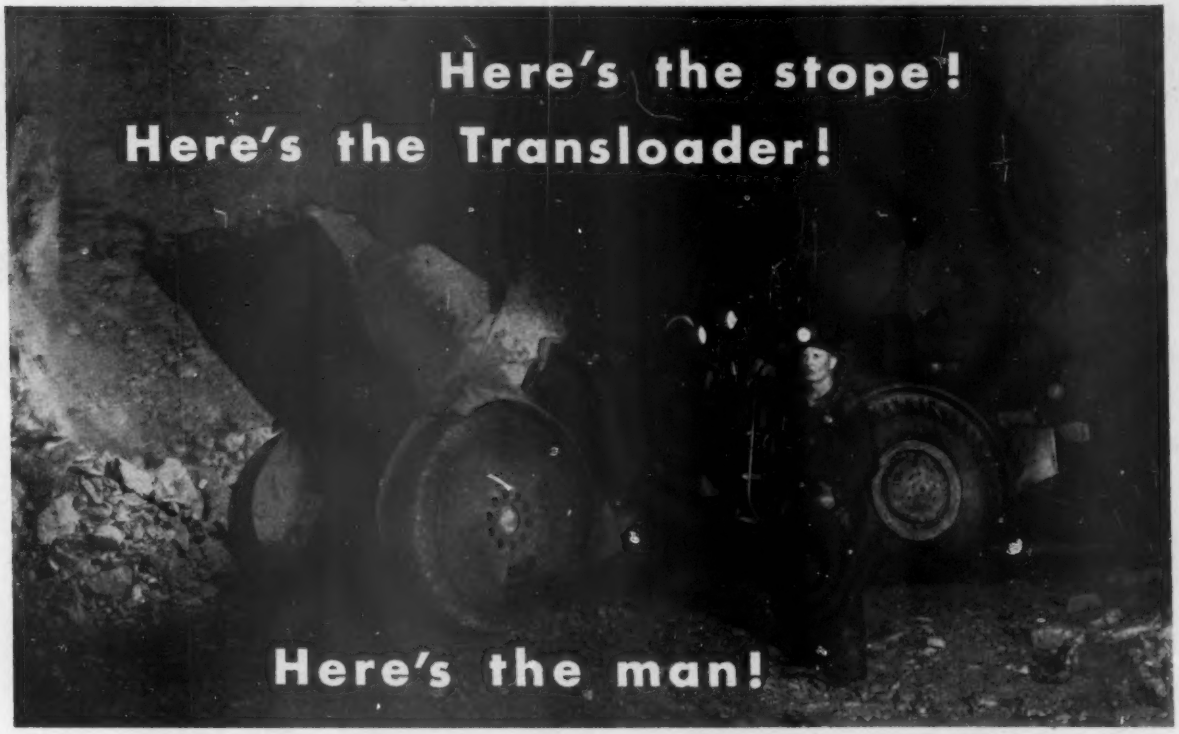
It is difficult to believe—but the truth is...

This S-D TRANSLOADER LOADED, HAULED and DUMPED 1,045 TONS in one shift!

THIS WAS NO TEST nor demonstration. This customer and user was backstoping. Several thousand tons had been shot. S-D Transloader operator Robert White was simply loading, hauling, and dumping as usual with his self-loading transport. The one way tram to dump hole was 150 feet. (S-D Transloader also operates more effectively and more efficiently than conventional equipment on long hauls.)

AT THE END OF THE SHIFT MR. WHITE HAD MOVED 1,045 TONS OF HARD ROCK! That was 190 loads! On the following night shift he loaded 180 times for 990 tons. He moved 2,035 tons in two consecutive night shifts!



THE FACTS ARE, FURTHER, that the S-D Transloader requires (1) the *lowest* original cost for tons handled . . . (2) *lowest* maintenance, due principally to extremely simple design . . . (3) *least* ventilation due to low horsepower to work done . . . and (4) *lowest* labor cost per ton!

The performances of many S-D Transloaders in several mines justify *your immediate* investigation! The Transloader is doing a job you cannot afford to overlook! Call us — today . . . 3-4191. Wire or write:
Sanford-Day Iron Works, Inc., Dale Avenue, Knoxville, Tennessee, U.S.A.

WE WILL BE AT LAS VEGAS . . . with the S-D Transloader! At our Sanford-Day BOOTH 43, in addition to the Transloader, you will be able to view documentary movies showing exactly what the Transloader is doing *in action* underground to increase production at tremendous reduction in cost! We invite you to visit with us at BOOTH "43" . . . American Mining Congress, MINING SHOW, Las Vegas, Nevada, Monday-through-Thursday, October 10-13, 1960.

SANFORD-DAY
KNOXVILLE, TENNESSEE

ONLY LOADER WITH..

You shift from any one gear to any other—forward or reverse... on-the-go. Allis-Chalmers tractor loaders make fast work far easier for any operator.

It's simple for a tractor loader operator to work faster—get more done. It's just as easy for him to go into a high gear as into a low gear—forward or reverse. ONE LEVER controls both speed and direction. No fumbling around with two or more levers or a combination of levers and foot pedals.

Besides operating simplicity, a tractor loader has *firmly connected axles*—attached to frame with 2-inch diameter steel pins . . . no rolling and shifting under load. *Extra stability* lets operators get and deliver

Enter 46 on card, page 257

move ahead with

. . SINGLE-LEVER SHIFT

bigger loads with greater comfort. Add *extra reach* for fast, even dumping and you can see why production is higher with an Allis-Chalmers tractor loader. Let your dealer show you. Allis-Chalmers, Construction Machinery Division, Milwaukee 1, Wisconsin.

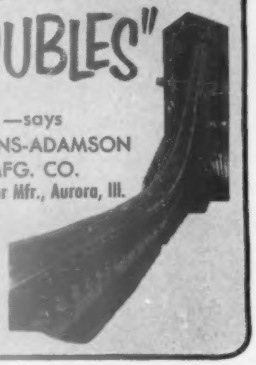
The "Big Three" tractor loaders range in size from the TL-14 with 5,300-lb carry capacity to the TL-20 (shown) with 9,000-lb carry. Each has a family of buckets—18 bucket loader combinations in all.

ALLIS-CHALMERS

. . . power for a growing world

"NO MORE LUBRICATION TROUBLES"

—says STEPHENS-ADAMSON MFG. CO.
Conveyor Mfr., Aurora, Ill.



"LUBRIPLATE Lubricants satisfy the 'one-shot' requirements of our conveyor idlers. LUBRIPLATE effectively lubricates each bearing in turn and flows through the hollow shaft to the next bearing. We do not know of a single case of bearing trouble through faulty lubrication where LUBRIPLATE has been used."

REGARDLESS OF THE SIZE AND TYPE OF YOUR MACHINERY, LUBRIPLATE GREASE AND FLUID TYPE LUBRICANTS WILL IMPROVE ITS OPERATION AND REDUCE MAINTENANCE COSTS.

LUBRIPLATE is available in grease and fluid densities for every purpose . . . LUBRIPLATE H. D. S. MOTOR OIL meets today's exacting requirements for gasoline and diesel engines.

For nearest LUBRIPLATE distributor see Classified Telephone Directory. Send for free "LUBRIPLATE DATA BOOK" . . . a valuable treatise on lubrication. Write LUBRIPLATE DIVISION, Fiske Brothers Refining Co., Newark 5, N. J. or Toledo 5, Ohio.

Enter 48 on card, page 257

RICHARD J. FRAZIER recently joined Harry T. Campbell Sons' Corporation in the newly created post of director of research. He was formerly vice-president in charge of production and also director of research and development at Anchor Concrete Products, Inc., Buffalo, N. Y.

LLOYD W. MANUEL, comptroller, Lafarge Cement of North America, Ltd., Richmond, B. C., and ROBERT L. LAMBERT, comptroller, Riverside Cement Company, division of American Cement Corporation, Los Angeles, have been elected to membership in the Controllers Institute of America. The institute is a non-profit management organization of controllers and finance officers from all lines of business.

ROBERT W. TOMLINSON has been promoted to the position of senior buyer of Alpha Portland Cement Company, succeeding JAMES I. MAGUIRE, who was recently appointed director of management services. Mr. Tomlinson is succeeded by RENTON B. BETHMAN as buyer.

DR. ERNEST D. KIRKENDALL, secretary of the American Institute of Mining, Metallurgical, and Petroleum Engineers, has received an Alumni Award from his alma mater, Wayne State University, Detroit, Mich., for distinguished achievement in the science of metallurgy. Dr. Kirkendall is the discoverer of a phenomenon in diffusion in solid metals now known as the "Kirkendall Effect."

R. EARL PRATT, assistant secretary and credit manager of Fischer Lime and Cement Company, Memphis, Tenn., was named delegate to the National Credit Congress held May 15-19 in St. Louis. LEVI BURNS, secretary and credit manager of Road Builders Corporation, was named alternate delegate.

JAMES E. TAYLOR has been appointed assistant to the vice-president, general sales division, Universal Atlas Cement Division of U. S. Steel Corporation. He was previously sales manager of the Illinois sales district.

NATHANIEL R. POTTER JR. has been named sales manager of the Hawaiian Cement Corporation, effective May 30. Mr. Potter was formerly associated with Grace Bros., Ltd., and previous to that he was vice-president and co-owner of the American Tile Company, Honolulu.

HAROLD A. SEGHI has been appointed sales representative for Marquette Cement Manufacturing Company in the Chicago and Cook County areas.

ROBERT V. HAYS has been appointed district representative, slag sales, for the Youngstown, Ohio, district of United States Steel Corporation. Mr. Hays succeeds FRANK MILLS, who is retiring.

R. JOSEPH KUKLICH has been named director of promotion and public relations for the Perlite Institute, Inc. He was formerly associated with manufacturers of building and architectural products in various capacities. At one time he operated his own marketing organization.

GEORGE K. MCCORD has been named Wisconsin district engineer for the Portland Cement Association, with headquarters in Milwaukee. He succeeds W. D. KIMMEL, whose retirement on the same date follows one of the longest periods of service of any P.C.A. district engineer.

Mr. Kimmell first joined the association in 1923 and since then has become a recognized authority throughout the Midwest on field engineering problems. He was also affiliated with both the Michigan and Nebraska state highway departments during a career spanning more than 40 years.

Mr. McCord joined the Ohio-West Virginia District as a field engineer in 1946. Previously he had served in various engineering capacities in the construction field.

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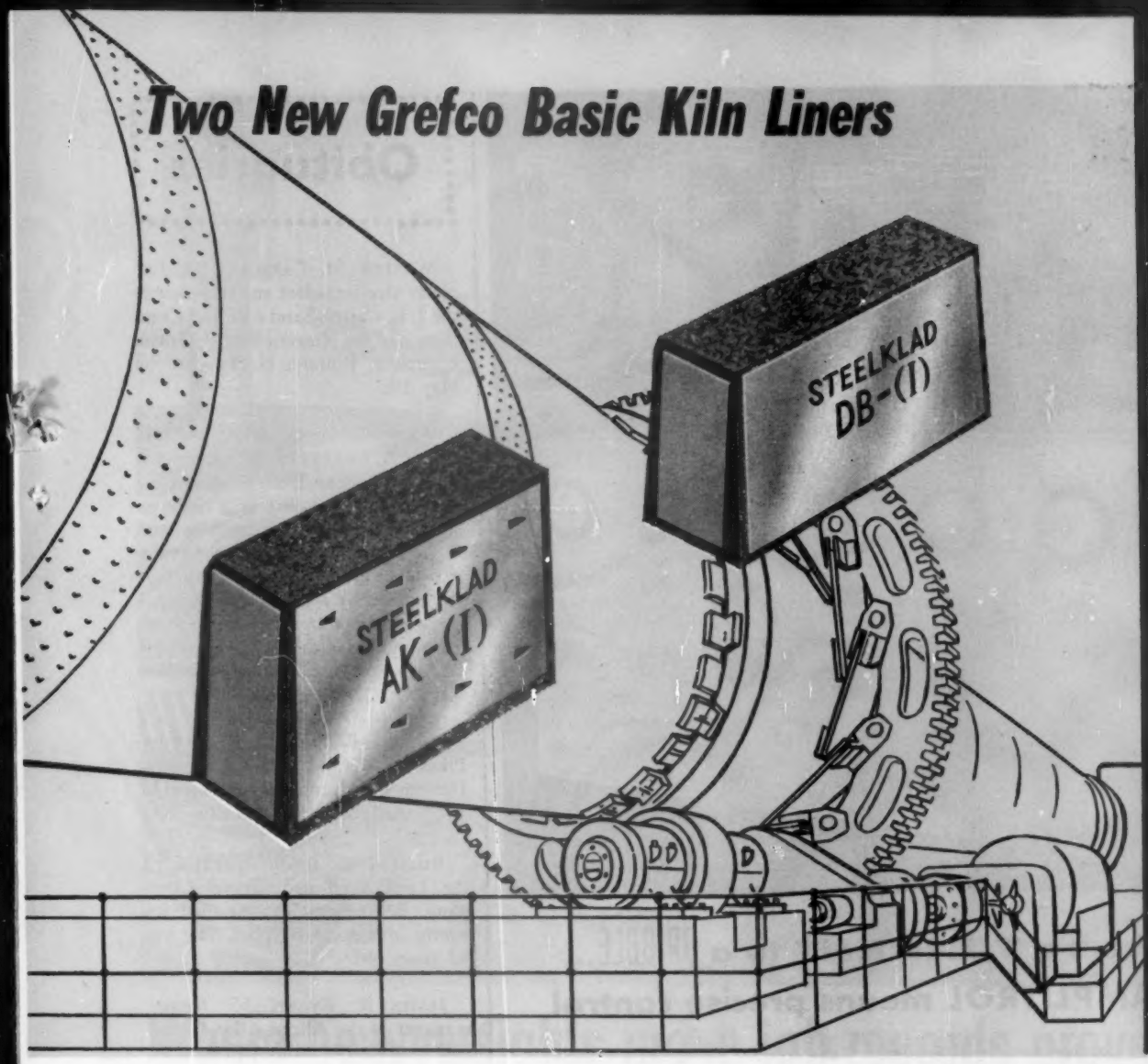
Two New Grefco Basic Kiln Liners



GENERAL REFRACTORIES

Maximum Service For Extreme Conditions

One or the other will do it—STEELKLAD-AK-(I) and STEELKLAD-DB-(I) are the results of watching and analyzing rotary kiln conditions all over the world. Every known extreme in burning zone conditions can be met with one or the other brick. And they're beveled for the easiest installation yet!

No two kilns impose identical demands on a refractory. Save time and money by taking advantage of Grefco's engineering service; use it to select the brick most suited to your conditions.

NEW STEELKLAD AK-(I) Low cost chemically bonded magnesite brick, with *integral* steel plates and attached expansion strips.

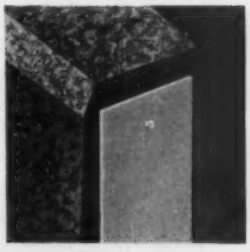
- Best attainable spall resistance
- Lowest thermal conductivity
- Excellent coating characteristics

NEW STEELKLAD DB-(I) *Burned* Magnesite Brick, ceramically bonded for great strength; shipped with steel plates and cardboard expansion strips attached.

- Maximum spall resistance in a burned brick
- Minimum loss of protective coating from intermittent operation
- Stubbornly resistant to destructive kiln atmospheres

NOTE THE BEVEL!
New STEELKLAD DB-(I) and STEELKLAD AK-(I) are the only rotary kiln bricks with a bevel. Results?

TIGHTEST POSSIBLE LININGS . . . the bevel makes it possible to drive any required additional shims or plates easily and rapidly for tightly keying individual rings.



HOT FACE IDENTIFICATION . . . positive and quick.

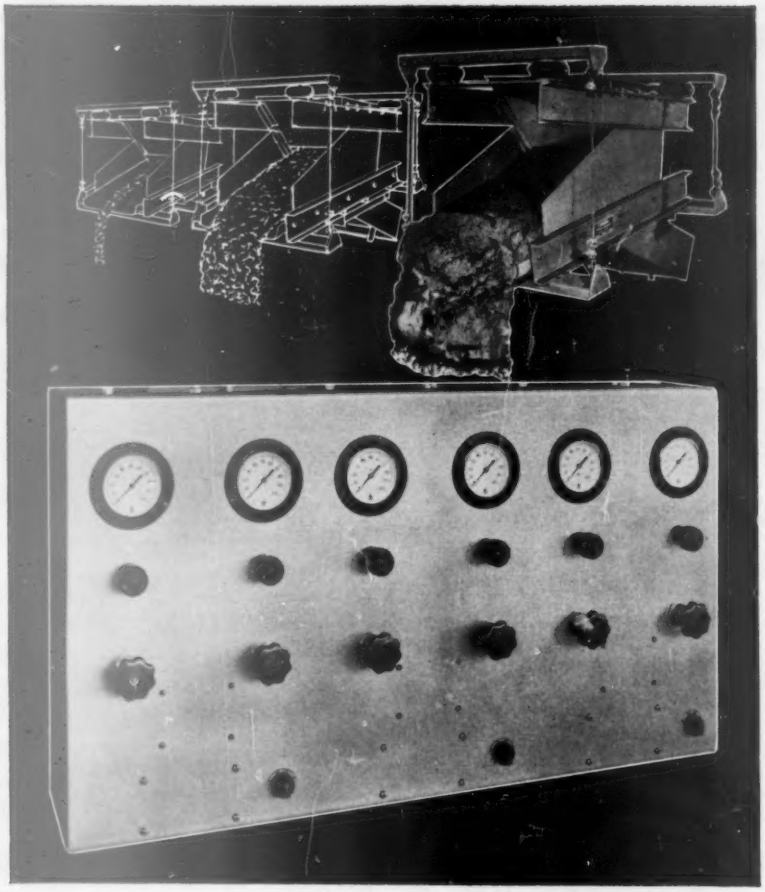
A Complete Refractories Service

Write for further information!

GENERAL REFRACTORIES COMPANY

General Offices: 1520 Locust St.
Philadelphia 2, Pennsylvania

District Sales Offices
In all principal cities



From a TORRENT to a DRIBBLE...
AMPLITROL means precise control

With Carrier Amplitrol Feeders you can control discharge rates from ANY distance. Carrier Feeders give you precise manual OR automatic control in response to signals from bin-level indicators, process-alarms, scales, load cells, ball mill or crusher drives.

Speed and Accuracy Combined
Three separate Amplitrol Feeders are controlled simultaneously with the control panel shown above. Used in a batch weighing system, the controls produce a fully adjustable high-low feed rate cycle for each feeder. For maximum batching speed with minimum batch variation, Amplitrol feeds the major portion of a batch at torrent rates—the remainder at a dribble. Shutoff at proper weight and recycling is automatic.

For more information, write Carrier Conveyor Division, CHAIN Belt Company, 218 North Jackson St., Louisville 2, Ky.

CARRIER CONVEYOR
~~NATURAL-FREQUENCY~~
VIBRATING EQUIPMENT
CHAIN BELT COMPANY

CONVEY • FEED
DEWATER • SCREEN
COOL • DRY
SCALP • COAT
DISTRIBUTE • ELEVATE

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Obituaries

WESTON M. CARROLL, 64, formerly vice-president and treasurer of the J. E. Carroll Sand & Gravel Company and the Niagara Sand & Gravel Company, Buffalo, N. Y., died on May 10.

WADE L. DONALDSON, 44, and JAMES A. CRAFT, 25, both sales officials of the Penn-Dixie Cement Corporation, were killed in a highway accident on May 23 near Marietta, Ga. They were enroute to Nashville, Tenn., on a business trip when their car was hit by a truck. Mr. Donaldson was assistant southern sales manager, and Mr. Craft was sales representative for the middle Tennessee district.

LEO C. PIKES, 82, operator of Pikes Peak Sand & Gravel Company, Denver, Colo., until his retirement in 1952, died recently in that city.

RUSSELL E. LIND, operator of the Lind Sand and Gravel Company, Bellingham, Wash., died recently in a local hospital. He was 63 years old.

JAMES R. EVANS, 55, former manager of the Alfred Atlas Gravel and Sand Corporation, Alfred, N.Y., died recently after a protracted illness. Mr. Evans had served in this post 32 years.

H. F. GREENE JR., 85, retired manager of the Coronet Phosphate Company (a division of Smith-Douglass, Inc.), Norfolk, Va., died recently in Lakeland, Fla., after several years of ill health. He had been associated with the phosphate industry since 1908 and had been with Coronet since 1909. He retired in 1941.

FREDERICK COTTON FISK, 94, pioneer cement plant engineer of Buffalo, N. Y., died on June 15 in Florida. He was responsible for the erection of 18 Lehigh Portland Cement Company plants in this country and abroad.

Where heavyweights move job records prove...

FIRESTONE TOUGHNESS PAYS OFF BIG!

Extra toughness: you get it in the cord, in the rubber . . . in every inch of Firestone off-the-highway tires. And it pays off big! Helps keep equipment on the job; helps keep jobs on schedule. Behind Firestone toughness are such exclusives as (1) Firestone Rubber-X, longest-wearing rubber ever used in Firestone tires and (2) Firestone Shock-Fortified nylon cord for top protection against impact damage. Through Firestone's Giant Tire Service, an expert will match tires to your job, and handle all tire maintenance. Just contact your Firestone Dealer or Store. Or write: Manager, Off-The-Highway Tires, The Firestone Tire & Rubber Co., Akron, Ohio.

ALWAYS SPECIFY FIRESTONE TIRES WHEN ORDERING NEW EQUIPMENT

Super Rock Grip Wide Base* Super Rock Grip Deep Tread*

TUBELESS OR TUBED

Firestone

BETTER RUBBER FROM START TO FINISH

Copyright 1960, The Firestone Tire & Rubber Co.
*Firestone T.M.

"Planet-powered '25'

"Our International TD-25's turbocharged engine doesn't seem to lug down under load," states Charles Skelton, superintendent for Mulzer Brothers, Tell City, Indiana. "This power, combined with planetary steering and Hi-Lo power shifting gets full loads fast and speeds-up load delivery stripping overburden."

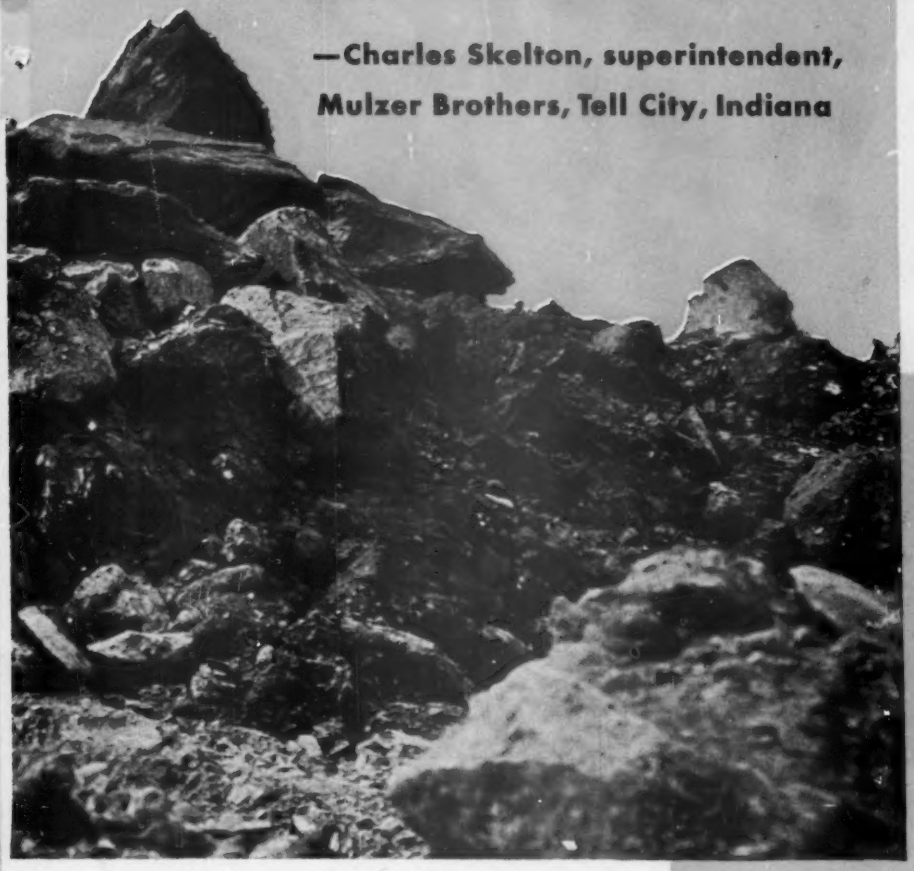
That's another way of saying that the "25," working three shifts daily on this coal-stripping operation, gives operating efficiency a big boost! They're stripping 30-foot overburden to get at a 42-inch coal seam: one-third earth; two-thirds shale, slate, and rock. The "25" takes off the top third—pushing full blade loads an average of 100 feet. A 6-yd. dragline removes the rest.

How a "25" outblades other rigs up to 50%—You 'doze straight ahead with heavy offset loads—you make full-load, full-power turns—where giant clutch-steered rigs slip, slue, and spill the load. Exclusive TD-25 "live track" Planet Power-steering eliminates load-limiting "dead-track drag."

With exclusive Hi-Lo, on-the-go power-shifting, the "25" gives you instant, all-the-way matching of power to condition. You roll up big loads in a hurry—and

gets full loads fast . speeds up delivery, stripping overburden"

—Charles Skelton, superintendent, Mulzer Brothers, Tell City, Indiana



Stripping overburden three shifts daily, Mulzer Brothers' TD-25 blades full loads, an average of 100 ft. Planet Power-steering and Hi-Lo power-shifting keep full loads on the move full time. On benching or highwalling, simply operate the bank-side track in high speed range, while keeping the outside track in low range—for full-bite, full-blade performance.

Here's your 76-page cost and production estimating book—newest, most authentic and complete guide for estimating material-moving costs—and for selecting equipment combinations for top profits, anywhere! See your International Construction Equipment Distributor!

keep 'em rolling fast. And with exclusive International DT-817 Diesel engine wallop, the "25" bulls along, 230 turbocharged hp strong—without "slow-motion" lug-downs, even at high altitudes!

Press the direct-start button—power-shift and power-steer the planet-powered TD-25 with full-king-size loads—around curves, upgrade, anywhere. Prove what it means to command full-time, full-load ability to outwork and outearn king-sized clutch-steered crawlers—up to 50%! See your International Construction Equipment Distributor for a demonstration!

International® Construction Equipment

International Harvester Co.,
180 North Michigan Ave., Chicago 1, Ill.
A COMPLETE POWER PACKAGE

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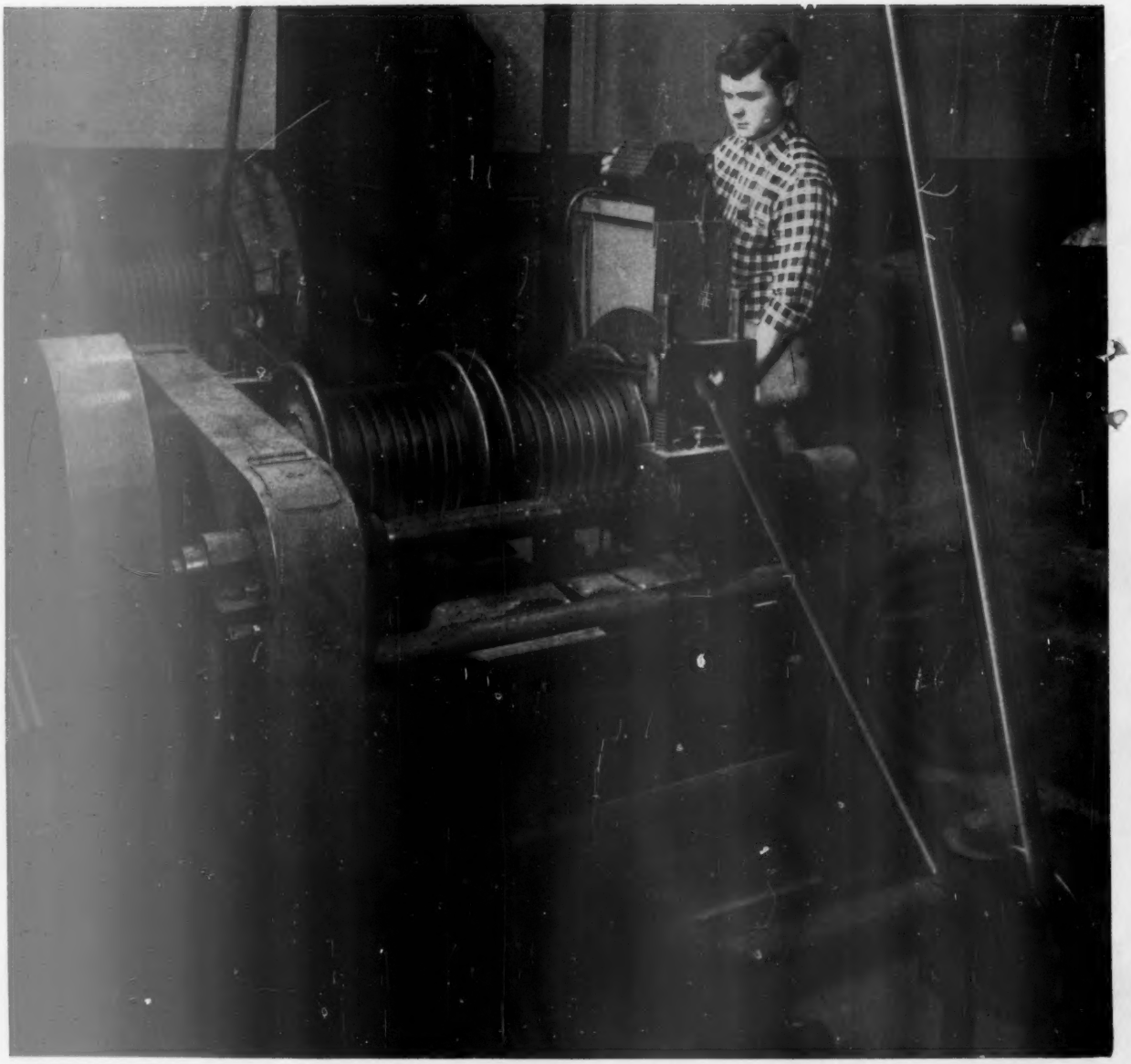

Accelerated testing of cable. This machine, designed by **AS&W engineers,** is testing mining machine cable to determine its resistance to reeling and pay off under tension, abrasion, flexing under tension, kinking under tension. Just one of the ways to determine the best insulating and jacketing compounds.

From portable tools to the largest power shovels, Amerclad Cables offer safe dependable service.

It's how you mix ingredients in just the right proportions that makes a big difference in cable performance.

USS Tiger Brand Electrical Wire & Cable

A standard cable for every special job

- Asbestos Wire and Cable
- Mold-Cured Portable Cord
- Shovel & Dredge Cable
- Paper & Lead Cable
- Varnished Cambric Cable
- Interlocked Armor Cable
- Special Purpose Wire & Cable
- Aerial, Underground and Submarine Cable

What's the difference in electrical cable?

In USS Tiger Brand Amerclad it's better engineering and quality construction

Engineered for the job. USS Tiger Brand Amerclad Cables are used in such a variety of applications that "engineering for the job" becomes extremely important. Special constructions are designed for electric shovels, dredges, mining machines, welders and portable tools. Cable life depends on how well the engineers have anticipated all the destructive forces that a cable encounters in service.

Quality construction. USS Amerclad's highly flexible construction—rubber insulated conductors and Amerprene jacket—is carefully designed to give you superior electrical performance and mechanical reliability. Dynamically balanced rope lay conductors, as opposed to loosely bunched groups of fine wires, give balanced performance and long, trouble-free service through elimination of unequal tension and elongation.

Each conductor is separately insulated with Amerite, a tough heat-resisting, special rubber compound that exceeds the requirements of ASTM, and other industry standards. A rugged abrasion resisting Amerprene jacket protects the cable from mechanical abuse.

Tiger Brand Amerclad Cables are as tough as they come. They soak up shock and vibration, withstand crushing impact, severe jerking and pulling for unbelievably long periods. Used outdoors for mining, quarrying and excavating machines, Amerclad resists the constant wear and abuse from contact with rocky ground. And installed on lighter indoor equipment—electric welders, shop tools and motor leads—Amerclad gives top performance even when it's dragged over rough floors, through oil, grease or water.

Amerclad's greater durability will pay for itself many times in unfailing service, and ability to handle rated loads. It's the toughest electrical cord and cable money can buy.

Send for catalog. The Tiger Brand Amerclad Cable story is told completely in our new book we've reserved for you. We'll send the book without cost or obligation. American Steel & Wire, Dept. 0302 614 Superior Avenue, N.W., Cleveland 13, Ohio.

USS, Amerclad, Amerite, Amerprene and Tiger Brand are registered trademarks

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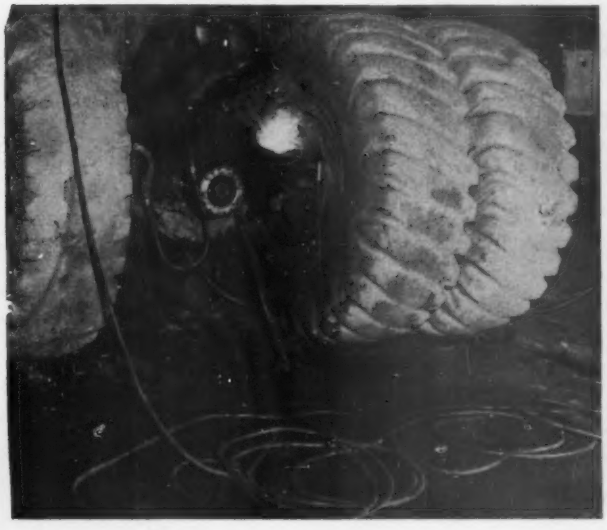


40 STORIES *from Pit to Surface*

. . . IT'S R/M

CONVEYOR BELT FOR LONG LIFTS!

Easy troughability, flexibility, super-strength synthetic cords, high wear-resistance—make R/M Conveyor Belts ideal wherever long lifts at high tensions are required. The installation shown here, for example, was a quarter-mile conveyor with a lift from pit to surface loading station nearly as high as a 40 story building. An R/M conveyor belt made an exceptional record on this rugged haul. There's an R/M heavy duty conveyor belt for every materials handling requirement . . . each engineered to haul fuller, heavier loads—and *last longer*. With proper engineering, for example, you can increase hauling capacity up to 60% with Ray-Man Conveyor Belt and 45° idlers! Ask your R/M representative about other R/M Conveyor and elevator belts, about advantages of extra-flexible, double compensated, rip-resistant Ray-Man . . . about Homocord, the extra-cushioned belt for unusually abusive shock loading conditions, or about the Wedlok metal fastener splice which avoids vulcanizing splices. Any R/M Conveyor Belt with "XDC" cover means extraordinary resistance to wear and tear, longer life—"More Use per Dollar." Write for Bulletin M302 and Catalog CB25.

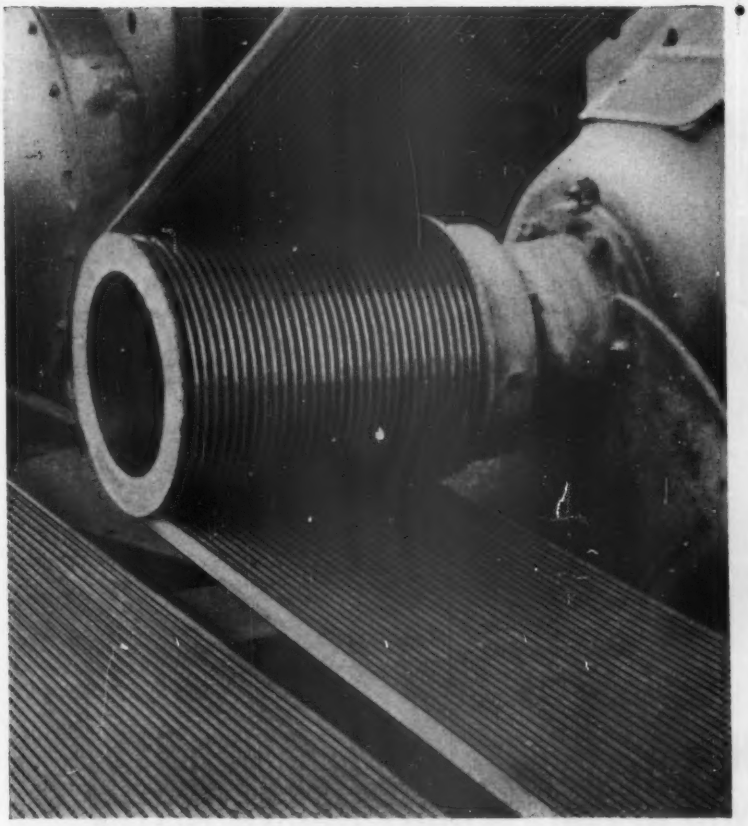
ENGINEERED RUBBER PRODUCTS . . . "MORE USE PER DOLLAR"

RM

RM1018

RAYBESTOS-MANHATTAN, INC.

MANHATTAN RUBBER DIVISION, PASSAIC, NEW JERSEY

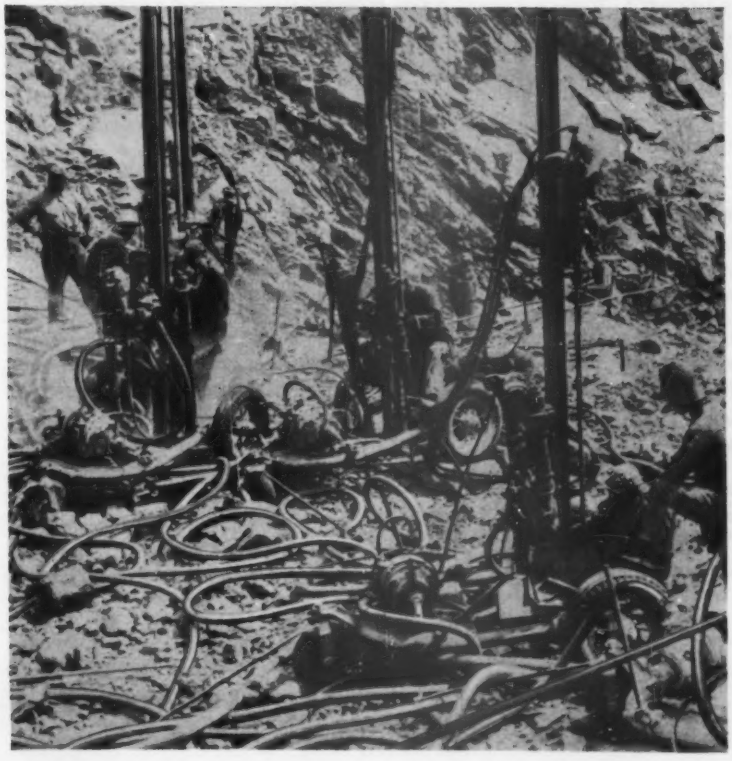


R/M POLY-V® DRIVE

More Power—
in Less Space
. . . with Reliability

A *single unit* V-ribbed belt across full width of the drive-sheave—*not* an assembly of V-belts—enables patented Poly-V to deliver much *more* power in the same space as a V-drive . . . or *equal* power in much *less* space! Single unit belt design also eliminates belt "length matching" problems . . . minimizes equipment down-time and belt replacement costs. Belt speed ratios remain constant from *no* load to *full* load to provide the smoothest running, coolest running—*longest wearing* drive you can install. Maintain groove shape. Just two sections of Poly-V Belt meet every heavy duty power transmission requirement. Write for Bulletin M141, or call your R/M Distributor.

CONVERT TO RM POLY-V and BE SURE!



HOMOFLEX HOSE

more flexible, weighs less than any hose for equal pressure

- **SUPER-STRONG**
- **PRECISION BUILT**
- **NO PRE-SET TWIST—WILL NOT KINK**
- **INSEPARABLE TUBE-TO-COVER BOND**
- **UNIFORM INSIDE AND OUTSIDE DIAMETERS**
- **EASIER, SAFER COUPLING**

Strong, lightweight, and "flexible as a rope"—Homoflex is the easiest handling hose and lasts longer. Made in types for air, water, other fluids and gases. Ask about other types of R/M rubber hose for your job applications. Write for Bulletins M620 and M694.

RG-2JS
For extremely hard abrasive rock
(Taconite, quartzite)

W7R
For hard rock
(Siliceous limestone, dolomite, sandstone, granite)

OW
For medium rock
(Limestone, sandstone, sandy shales)

OSC-1G
For soft formations
(Calcite, shale, clay)

HUGHES ROCK BIT RESEARCH HELPS YOU GET BLAST HOLES DOWN FASTER

In furthering the development of "Rota-Blast" rock bits for mining, all new bit designs are thoroughly tested in the Hughes drilling laboratory before they are released to the field. A rotary drill, capable of simulating actual field conditions, is used for tests in which thousands of blocks of rock, such as the 5-ton block of quartzite, pictured here, have been drilled. These blocks represent the types of formations in which the bits being tested are to be used.

Performance of bits is observed under various weights, rotational speeds, air pressures and air velocities. Distinctive patterns, cut by each type of bit on bottom, are studied to help in the evaluation and improvement of rock bit design and performance.

Through Hughes' research in the laboratory and in the field, advances are constantly being made in the design and manufacture of every size and type in Hughes complete line of "Rota-Blast" rock bits. This continuing research program — largest in the industry — was started more than fifty years ago.

Your Hughes representative will recommend the "Rota-Blast" bit designed to keep your drilling costs down. He is also qualified to offer you assistance in your blast-hole drilling program. His help is available for the asking.

HUGHES
industrial products
HUGHES TOOL COMPANY • HOUSTON, TEXAS

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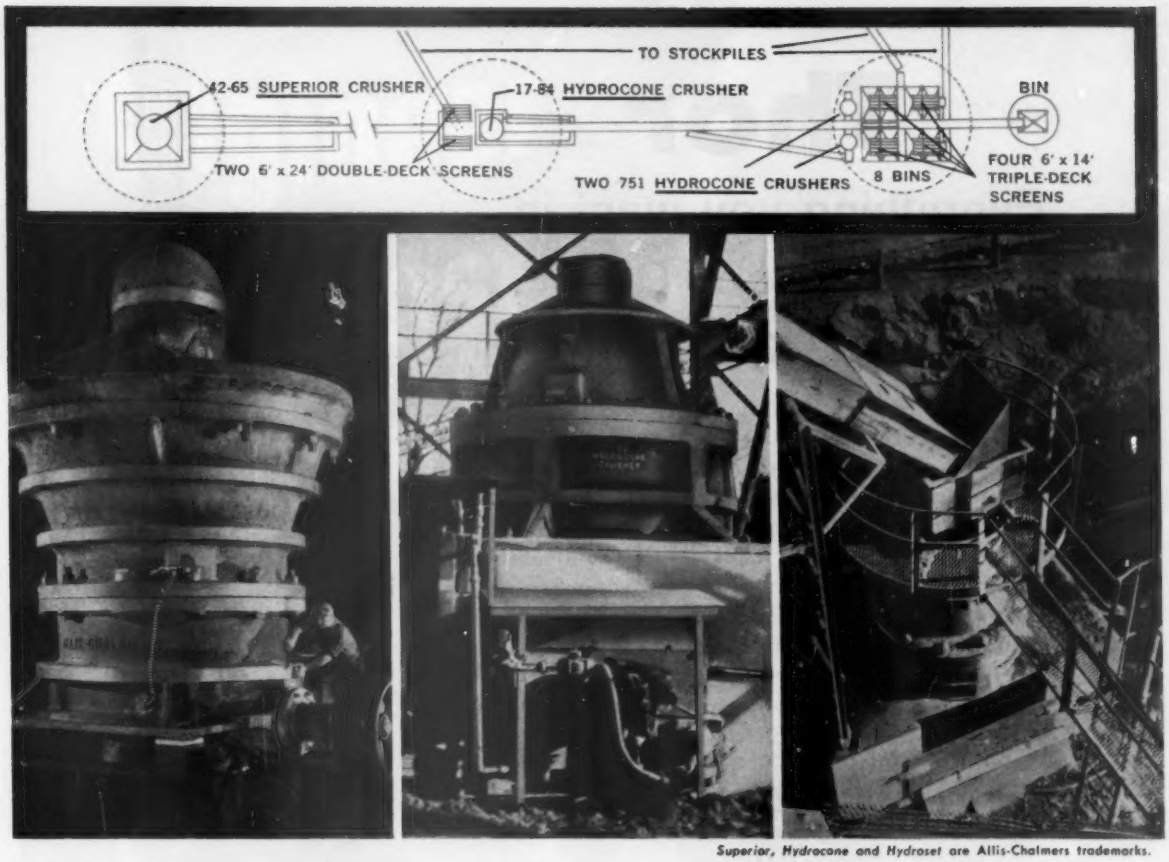
ALLIS-CHALMERS



Superior, Hydrocone and Hydroset are Allis-Chalmers trademarks.

Rugged Hydroset control sets a fast pace for crushers:

900,000 tons in 4½ months!

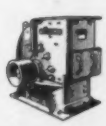
Crushing trap-rock is a tough assignment. A tight time schedule makes it even tougher for Chantilly Crushed Stone Company. They were awarded the contract for all of the crushed stone — base course and concrete specification stone — for the new $75,000,000 John Foster Dulles Airport just outside Washington, D. C.

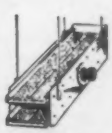
To meet production requirements, they had to have crushers that were rugged and dependable. Crushers that would provide rapid compensation for the wear that always accompanies the crushing of trap-rock. Crushers that would *not* require extensive downtime to unload in the event of power failure.

To get the job done, Chantilly built their plant around four Allis-Chalmers crushers: a 42-65 *Superior* gyratory for primary crushing, a 17-84 *Hydrocone* crusher for secondary crushing, and two 751 *Hydrocone* crushers for tertiary crushing. All four crushers were equipped with *Hydroset* control.

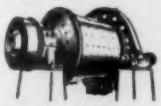
It was *Hydroset* control that made compensations for wear in minutes, not hours... made the quick changes in product size from base course to concrete specs.

Ask your A-C representative about the rugged flexibility of A-C crushers equipped with Hydroset control. Or write **Allis-Chalmers,** *Industrial Equipment Division, Milwaukee 1, Wisconsin.* A-1336


Hammer Mill


Vibrating Screen

Jaw Crusher


Grinding Mill

Kiln

Thor

Everything you want in Crawler Rock Drills...

and more!

Thor's all new Crawler, Model TR-5, outperforms wagon drills three to one and every other crawler by quite a margin. One man operation. All-hydraulic controls completely flexible to maneuver mast and boom into any drilling position. Thor TR-5 is equipped with Thor model 140 4½" drifter. Two 8 h.p. rotary air motors propel the compact drilling machine. Ask your Thor "Red Tool" distributor to show you the movie of this remarkable crawler. Thor Power Tool Company, Aurora, Illinois. Branches in all principal cities.

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engineer your costs downward

A-C ALLIS-CHALMERS

Modernize with Assurance for the years ahead

JAW CRUSHERS

GYRATORY CRUSHERS

GRINDING MILLS

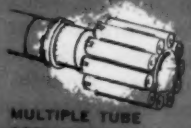
VIBRATING SCREENS

HORIZONTAL COOLERS

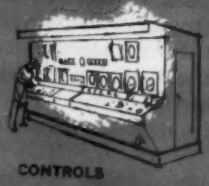
ROTARY COOLERS

WET AND DRY CHAIN SYSTEMS

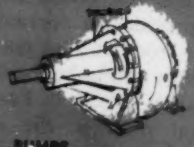
INTERNAL HEAT EXCHANGERS

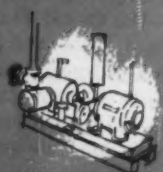

MULTIPLE TUBE COOLERS

SLURRY FEEDERS


CONTROLS

MOTORS


PUMPS


COMPRESSORS

For more information contact your A-C representative or write Allis-Chalmers Industrial Equipment Division, Milwaukee 1, Wisconsin. A-1358

new machinery

● A new, crawler-mounted drilling unit, the G-900 Tracdril, has been developed by Chicago Pneumatic Tool Company.

According to the manufacturer, the unit, after five years of research, offers eight features not presently offered on crawler-mounted drilling units.

The rig is capable of drilling over either track at right angles. The unit covers a 17-ft. diameter 180 deg. arc.

Capable of drilling horizontal snake holes 25 in. from the ground, the Tracdril's boom can be raised to a height of 11 ft. for horizontal breast holes. The carriage dump adjusts through 360 deg., which increases top-hole reach. An 85 deg. carriage swing allows vertical holes to be drilled regardless of slope conditions.

A 12-hp. tramming team, powerful enough to tow a 600 c.f.m. compressor up a 20 percent grade or maneuver on rough terrain, provides the driving force for the unit. Five lower track wheels, manganese steel pads, and the 10-in. wide tracks of the Oliver crawlers give stability. Release of the tramming throttle snaps the "dead-man" controls to neutral while automatic brakes lock the tracks positively in place. Throwout clutches disengage the tramming motors when towing, eliminating motor burnouts.

All drilling maneuvers—swing, lift, dump, and tilt—are hydraulically controlled. Dual controls—one set on the forward end of the drill boom, the other at the tramming position—provide the operator with control of every rig maneuver from front or rear.

The G-900 Tracdril is said to be the ideal mount for the 4 in. or 4½ in. deep-hole drill. Featuring built-in, forward-reverse-neutral rotation, the deep-hole drill works in or out of the hole quickly. The unit uses sectional steel rods. The Tracdril is also easily adaptable to the Rotauger for high-speed drilling in softer formations. **(350)**

● Availability of the Caterpillar 966 Traxcavator, second in a line of wheeled, front-end loaders, has been announced by Caterpillar Tractor Company.

The 966, similar to the previously announced 944, is a 140-hp. unit, with a 3¾ cu. yd. bucket. All loader lift mechanisms is located completely ahead of the driver's compartment.

The maximum lift height is 154 in., and the maximum reach is 35⅝ in. at that height. At ground level the bucket tilt-back is 41 deg.

Equipped with a 2-speed power shift transmission, the 966 has four operating speeds, and "one finger" forward-reverse shifting.

Three separate sets of brakes are provided with the machine. Application of the left brake pedal not only brakes the machine, but also automatically shifts the transmission into neutral. The right brake pedal is not connected to the transmission, and performs only normal braking action. A parking brake automatically shifts the forward-reverse lever into neutral, and locks the transmission output shaft.

The 966 is powered by a 6-cylinder, 205-hp. turbocharged diesel engine. The 24-volt direct electric starting system is standard, and a gasoline starting system is available as optional equipment. Both systems incorporate in-seat starting. **(351)**

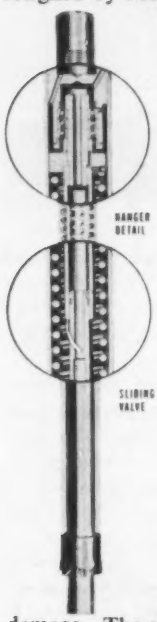
● A dust control system for use in small quarries has been developed by the Johnson-March Corporation. The new unit, the Type G Chem-Jet Proportioner system, is said to make possible savings up to 33 percent.

Dust is controlled by applying a small amount of moisture at those points in the operation where dust is created. A specially formulated surface-active compound is utilized to produce wetting action. **(352)**

and equipment

for further information use card on page 257

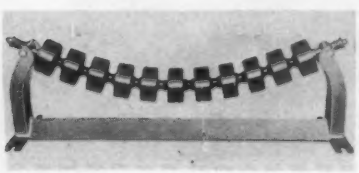
● A new pitcher sampler has been designed by Mobile Drilling, Incorporated, to recover accurate samples from problem clays, soft rock, and friable shales.



Drilling fluid reportedly cannot erode or contaminate the sample even in soft overburden or water-sensitive formations. A spring-seated shelby tube telescopes into the outer barrel, as the cutters core harder formations, to eliminate excessive pressures and prevent tube damage. The unit requires no presetting or surface control. The drill can be stopped, and the rod rechucked, or raised slightly, without breaking the core. Separate reaming operations to obtain deeper samples are not needed. (353)

● A new catenary conveyor carrier, the FLEXIROLL, providing true catenary suspension under all load conditions, has been developed by Stephens-Adamson Manufacturing Company.

A high-tensile, spring-steel "dead shaft," to which is mounted a mild-steel trunnion and a shock-absorbing compression spring is featured on the carrier. The shaft has an initial set which provides a trough to enable the most rigid of belts to make contact with the face of all rollers when the belt is running under all load conditions. According to the manufacturer this results in support for the belt in a natural arc, which contributes to more efficient belt training and reduced belt wear.

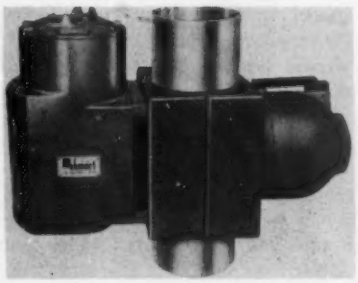


The carrier rollers resist reaction to corrosive, abrasive, and combustible materials, and the natural flexing action of the carrier reduces spillage and material build-up. The all-steel, jig-welded frame is self-cleaning, as is the roller assembly.

The FLEXIROLL carrier is available for 18-in., 20-in., 24-in., 30-in. and 36-in. belt widths. (354)

● A rubber-tired front running gear, designed to allow crawler tractors to tow rubber-tired trailed units normally used behind rubber-tired prime movers, has been announced by the Athey Products Corporation.

The front-running gear (or dolly) forms a connecting link between the crawler tractor and the rubber-tired trailed unit. The dolly is made in three sizes to mount to all Athey trailers and Caterpillar scrapers for the Caterpillar DW21, DW20, and No. 619 tractors. The dolly will provide a longer work season for rubber-tired trailed units, permitting operation in foul or sloppy footing. Cable shearing, to match crawler tractors and cable control units, is available as are air brakes, if these are needed for trailed unit. (355)



● Two new density gauges for automatically measuring the specific gravity or percent of solids are available from The Ohmart Corporation. These gauges measure liquids flowing through processing lines in pipes through 8 in. in diameter.

Both Model PGV and Model PG utilize a point source of radioactive material mounted in a safety-shielded holder on one side of the line, and an Ohmart measuring cell on the other side. The cell detects radiation energy in proportion to the density of the material flowing past the gauge, and change it into an electrical signal which is amplified and fed to a recorder or controller for actuating pumps or valves.

The gauge is particularly suited to severe or hazardous locations because it does not contact the material being measured. The housing is designed to be rugged, waterproof, and explosion-proof.

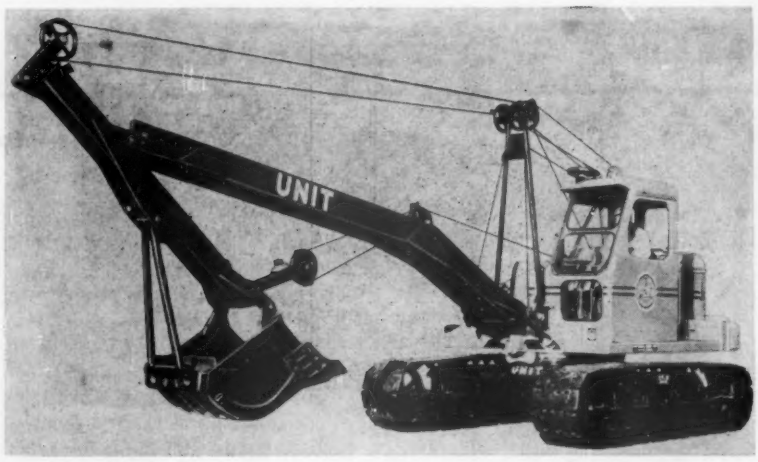
Model PG uses electrical zero suppression; and Model PGV uses a patented Ohmart compensating cell for longer term stability. The gauges measure spans as narrow as 0.15 specific gravity units with a precision as narrow as 0.0015 units. (356)

Check
MORE INFORMATION, PLEASE,
pages 257—258,
for solutions to your problems.

● A pallet-loading machine that permits high speed one-man loading of standard pallets for transporting by fork-lift truck has been developed by Power-Curve Conveyor Company.

The powered turntable station, a link between conveyor and fork truck, is used with a standard Power-Curve flexible loader and swivel stacker. Bags are power-propelled into position on the pallet with machine operator guiding each bag, using any palletizing pattern.

When a pallet is loaded, the turntable is power-rotated to position a new pallet while the loaded pallet is removed by fork lift. More than 1,000 bags an hour can reportedly be palletized by one man. **(358)**



● A new ¾-cu. yd. shovel, convertible to crane, dragline, backhoe, clamshell, or magnet, is now available from Unit Crane & Shovel Corporation.

Fifty percent more braking ability is claimed for its 17¾-in. diameter by 5-in. wide brake. Other features are: ventilated housings, disc-type clutches mounted on high-speed countershafts, and 44 large-type teeth incorporated in the clutch discs. A one-piece cast gear case encloses all gears and shafts, which operate in a constant bath of lubricant.

In-line mounting of gas or diesel engines with main machinery gives immediate power action. The independent boom hoist permits power raising and controlled lowering of the boom at high speeds. **(359)**

FARRELL-CHEEK ELEVATING and CONVEYING PARTS

OUR Fiftieth YEAR

FOR THE ECONOMIES OF TOP PERFORMANCE WITH MINIMUM MAINTENANCE AND DOWNTIME

Industrial Chain and Pins, Buckets, Sprockets, Rollers and Wheels from electric furnace carbon and alloy cast steel. You receive great benefits from ordering all conveying and elevating parts from FARRELL-CHEEK.

They are designed and integrated to work together perfectly during a long life of dependable service.

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Finest Name in Cast Steel!

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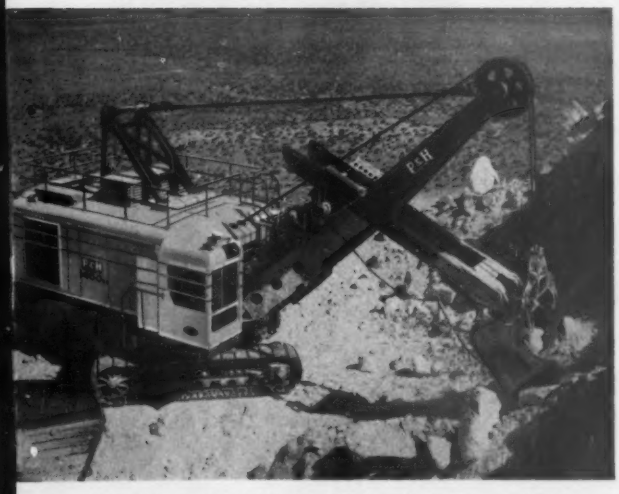
Enter 65 on card, page 257 →

IF PURCHASES ARE ENDORSEMENTS...

P&H is the №1 choice in Quarrying

IN THE LAST 5 YEARS 75% OF ALL ELECTRIC SHOVELS INSTALLED IN U.S. QUARRY OPERATIONS HAVE BEEN P&H



4½-cubic yard P&H Model 1400 is also built as a diesel-electric to provide its own integral electric power supply for operation in areas remote from public utility sources.

P&H has earned this widespread acceptance in the quarrying industry because of lower per-ton loading cost. This day-to-day benefit to owners of P&H Electrics results from two basic advantages:

1. **Higher rate of production** made possible by exclusive, patented P&H design principles: MAGNETORQUE® Hoist Drive and Electronic Control.
2. **Vastly superior service and parts availability** reflecting Harnischfeger Corporation's partnership philosophy of responsibility to buyers of its products.

Compare before you buy—for more information write today to Dept. 533-A Harnischfeger Corporation, Milwaukee 46, Wisconsin.

HARNISCHFEGER P&H CONSTRUCTION & MINING EQUIPMENT

Milwaukee 46, Wisconsin

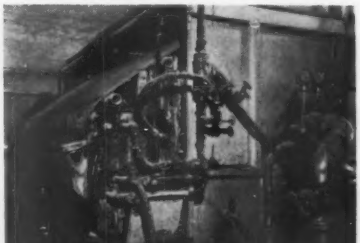
● A new line of emergency lighting and power units have been designed by the American Television & Radio Company. The completely automatic units permit continued operation at 115 V., a.c., of critical lighting systems, and other vital electrical equipment in the event of power line failure. Operation by the unit begins within 1/20 of a second after power line failure.

All models are equipped with heavy-duty plug-in type inverter vibrators which have 4-point voltage regulators to make possible the proper voltage for the power load being protected. They are recommended only for use with loads having power factors greater than 70 percent. To operate lower factor loads (as low as 50 percent), additional external power factor correction is required. (360)

● A new, easily mounted chain sleeve-clamp, for attaching rubber sleeves at hydraulic pipeline joints, is being manufactured and marketed by the Black Brothers Company.

The clamp has application in dredging operations, hydraulic mining of sand and gravel, and similar installations where hydraulic pipelines are joined by rubber sleeves to provide flexibility in the line.

The clamp consists of a triangular head, a 1-in. high screw, a swivel handle, and a chain welded to one end of the screw, and hooked to the head of the other end. (361)



● Industrial filtration by means of washing of the filter media during continuous operation has been developed by The Eimco Corporation for new EimcoBelt vacuum filters.

The EimcoBelt reportedly is the only continuous belt drum filter which removes a cloth synthetic fabric medium, as well as woven metallic media, from the drum for cake discharge and washing, and returns it to the drum every filter cycle. An automatic aligning mechanism keeps the medium in alignment at all times without operator attention. (362)

Screen Story...

At the Santa Maria, California, plant of Southern Pacific Milling Company, a 6' x 16' Overstrom Single-Deck washing and de-watering screen stands guard over the WEMCO HMS installations. The big Overstrom takes two sizes in parallel on its double-crowned divided deck — removing that final bit of dirt and excess water just ahead of the two HMS plants.

It's easy to combine *special features* with Overstrom built-in quality to satisfy individual job requirements.

Stepped, split, and divided decks; integral and stationary hoppers and chutes; wash pockets and spray piping; feed boxes and dust lids; ball decks and electric heaters; auxiliary structures — *all these can be provided on short notice at low cost!*

You give us the problem, we'll deliver the solution! Proof through performance? Drop us a line and you'll receive more pictorial examples of *"Overstrom On the Job."*

OVERSTROM VIBRATING SCREENS

OVERSTROM & SONS, INC • 2213 West Mission Rd • Alhambra, California

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Model 35SL
35 ton payload

REPEAT ORDERS *are Our Best Testimonials!*

Since KW-DART placed its Model 35SL on the market two years ago, it has proved its excellent performance on job after rugged job. Its 24-cubic yard capacity (struck), its extreme maneuverability and durability assure the operator maximum operation at minimum cost. The 35SL, like *all* KW-DARTs, is tonnage engineered to stay on the job.

SINCE THEIR ORIGINAL FLEET ORDERS, 6 MAJOR COMPANIES HAVE RE-ORDERED FLEETS OF THE KW-DART 35SL...SEVERAL HAVE RE-ORDERED *TWICE!*

Builders of heavy duty trucks since 1903

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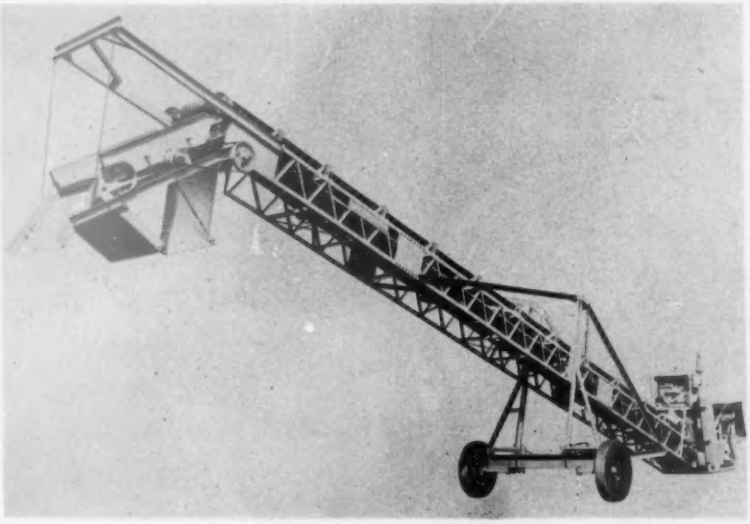
Enter 67 on card, page 257 ➔

● The new Allis-Chalmers TL-12 front-end loader has a 4-wheel drive, carrying capacity of 4,000 lb., static lifting capacity of 9,500 lb., and a 4-speed Tractomatic transmission.

A lever on the steering column controls both forward and reverse without stopping the machine to clutch, and shift gears. Four buckets are available in capacities from 1 to 2 cu. yd. Forward speeds are provided to 21.2 m.p.h., and four reverse speeds to 27.9 m.p.h.

The TL-12 is available with either Allis-Chalmers 77-hp. gasoline or 76.5-hp. diesel engines. (363)



● A new and improved portable conveyor-screening plant has been announced by Lippmann Engineering Works, Incorporated. The unit combines reciprocating feeder, conveyor, and vibrating screen, and can be transported from one location to another without dismantling.

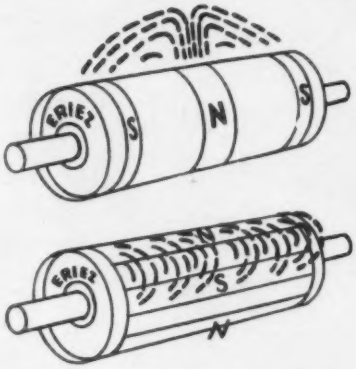
Both engine and drive are located at ground level. This feature offers three advantages over the customary head-end drive: (1) increased concentration of weight at the tail-end of conveyor improves balance and stability, eliminates the need for ground-support pole, and gives unobstructed loading area under the screen; (2) the ground-level location of the engine saves time and effort for start-stop, throttle-control, refueling, and maintenance; and (3) extended drive linkages to head-end pulley are completely eliminated.

The new design is available with either a bulldozer feeder trap, or with a hopper to accommodate overhead charging. The continuous-flow reciprocating feeder has five feed settings. The unit is available with single- or double-deck screen.

Under average conditions, clean, closely sized aggregates can be produced at the rate of 50 cu. yd. or more per hour. (364)

● A line of permanent magnetic pulleys for automatic separation of large or small iron contamination is offered by Eriez Manufacturing Company.

Two separate types are available with differences in design resulting in basically different magnetic fields around the pulley. The CR pulley is constructed with a radial design to maintain a deep, powerful magnetic field suitable to heavy applications involving large pieces of tramp iron. The radial pattern aligns heavy metal parallel to the shaft for separation.



The AA pulley is built with magnetic poles parallel to the shaft, to handle small or medium tramp iron, as well as fine iron contamination, in average material flows.

With either type of model the principle of separation is the same. The magnetic field of the pulley, installed as the head pulley on the belt conveyor, acts through the belt to hold ferrous objects securely until they reach the underside of the pulley, where they are automatically released from the magnet's grip. Nonmagnetic materials follow the normal trajectory and are separately discharged well ahead of iron. (365)

● Manufacture of "B" black blasting powder and pellet powder is announced by Austin Powder Company.

Black blasting powder will be offered in FF, FFF, and FFFF grain sizes in 25-lb. kegs. Pellet powder will be of the standard type and available in 1⅜ x 8 in., 1½ x 8 in., 1¾ x 8 in. sticks packed in 50-lb. boxes.

Black powders, used in open work where a slow heaving action is desired, are usually ignited with safety fuse or electric squibs. (366)

Enter 69 on card, page 257 ➔

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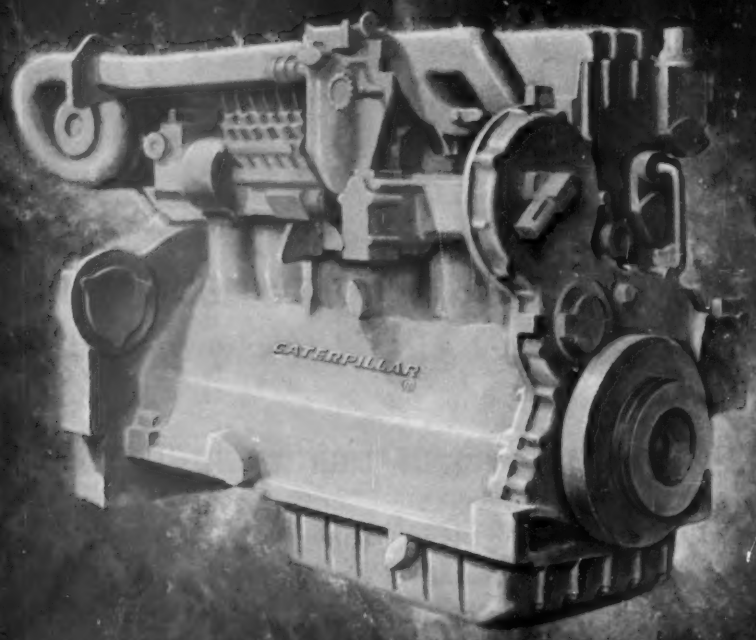
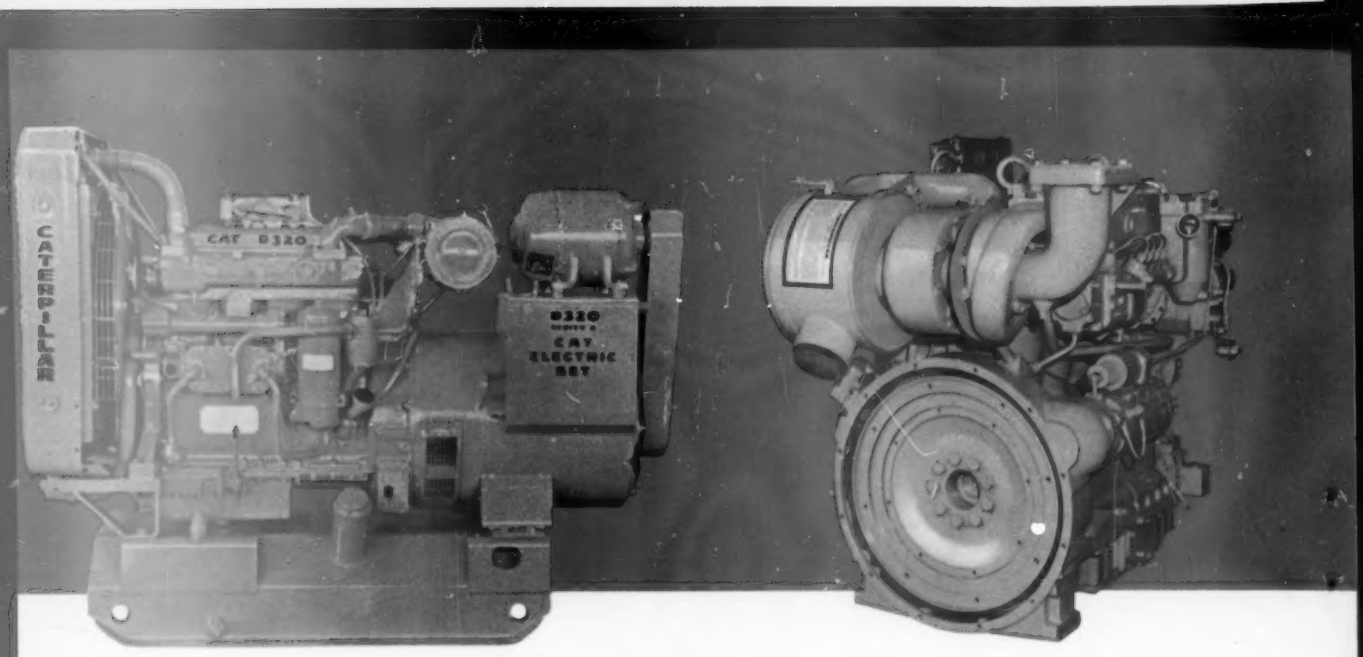
Kansas City 41, Missouri, U.S.A.



NEW CATERPILLAR DIESELS

BY CATERPILLAR

Caterpillar announces a new line of four-cycle diesels that sharply reduces physical dimensions and weight-to-horsepower ratio. Features of durability, fuel economy and dependability, long associated with Caterpillar four-cycle diesels, are still apparent.



D320...130 HP
(Shown as Electric Set*)

D330...180 HP
(Shown as Industrial Engine*)

NEW FROM CATERPILLAR—HIGH OUTPUT, LIGHTWEIGHT, COMPACT DIESEL ENGINES

Since introduction of the first mobile diesel engine in 1931 Caterpillar engineers have been testing materials and methods to reduce diesel size and weight and at the same time develop more horsepower. Three products of this program are the new D320, D330 and D333. Their size, performance and price now offer significant and increased economic return to the user.

Now you can get premium four-cycle performance . . . and what is very important to you . . . at no premium in price.

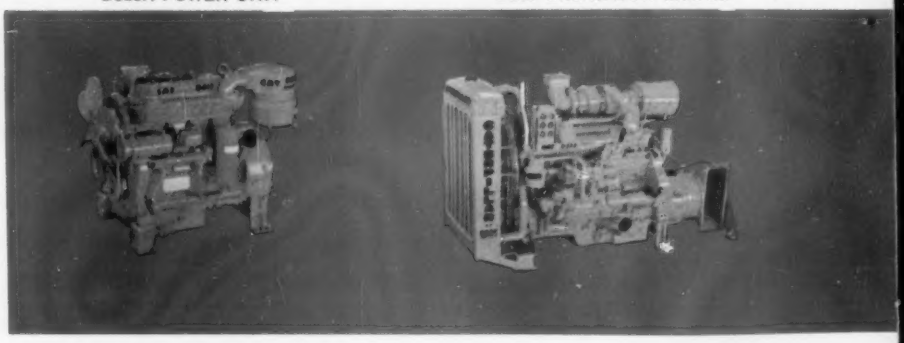
These engines and the rest of the Cat Diesel line are designed for your job or manufacturers' equipment whether it be industrial, electric power generation or marine.

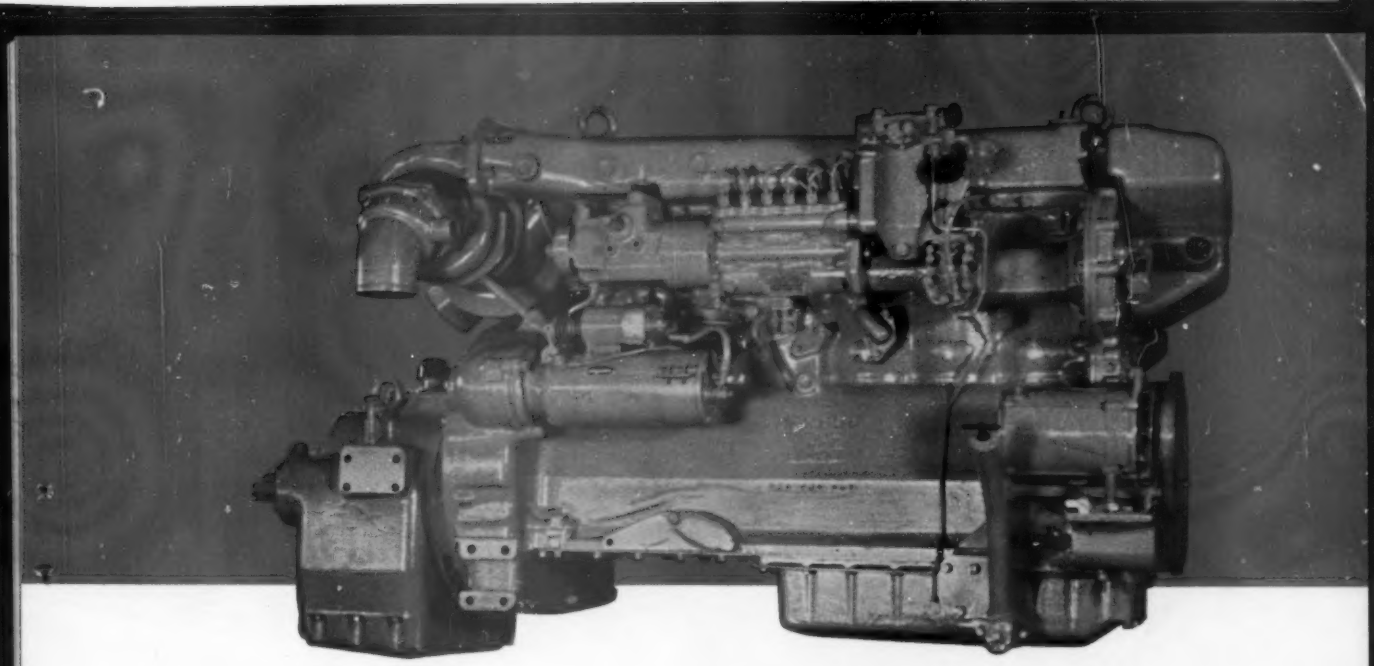
Shown below are more models. Space prevents the illustration of Caterpillar's complete line running to hundreds of configurations.

Caterpillar manufactures a full line of diesel and natural gas engines. Diesels range in horsepower up to 730; output of the largest electric set is 400 KW. Diesels are available in industrial, electric set and marine versions. Caterpillar also manufactures the lowest cost per horsepower natural gas engine on the market today. Hundreds of thousands of Cat Diesel predecessors to the new series have set performance and economy records, the world over.

D311H POWER UNIT

D337 EXCAVATOR MODEL





D333 . . . 270 HP
(Shown as Marine Engine*)

*All available in industrial, electric set, or marine configurations. These are maximum usable horsepower ratings with 85° water to aftercooler.

GOOD SERVICE LIFE Valve rotators insure perfect valve seating, give extended valve life. Turbocharging helps keep valve temperature lower. Pistons are spray cooled from underneath and cylinder liners are full length, wet type for better heat transfer. These features and many others such as elliptically shaped pistons and shot peened, fatigue-resistant crankshafts make this series dependable performers.

SMOOTH AND QUIET RUNNING All of these engines are smooth running. The four-cylinder D320 and D330 have built-in balancers that remove the roughness characteristic in four-cylinder engines. Turbocharging muffles exhaust noises to a point where mechanical muffling or insulation is not often needed.

ECONOMICAL These engines have a precombustion chamber injection system design which is non-sensitive and lets the engine digest lower-cost, heavier, higher-heat-content fuel. Being able to burn fuel such as commonly available household furnace oil compared to gasoline or premium diesel can save many thousands of dollars in fuel costs over the life of the engine.

DEPENDABLE These engines can idle for extended periods, then accelerate to full load and speed with a clean, clear exhaust. This ability to burn fuel completely over a full range of speed and load is the result of four-cycle design plus the use of a precombustion chamber injection system. It results also in better part load fuel economy.

POWERFUL The specification sheet horsepower is the horsepower you can use. There is no need for derating with a Cat Diesel. In fact, you can request and get a formal horsepower certification with each engine you purchase.

D342 MARINE

G375 NATURAL GAS

D397 ELECTRIC SET

Completed in 1959, the new Mossville, Illinois, Industrial Engine Plant manufactures Cat Engines on a mass-production basis.

Partially complete, Caterpillar's new Technical Center provides an appropriate research atmosphere and ultra-modern facilities. Two of these buildings are devoted to prime power research.

Basic in-line Diesel and Natural Gas Engines are also machined and assembled in this modern Peoria, Illinois, plant, completed in 1948. Another large plant (San Leandro, Calif.) manufactures fuel injection components.

FROM POWER CITY COMES MODERN DIESEL AND NATURAL GAS ENGINES PLUS DIESEL ELECTRIC SETS FOR EVERY POWER USE

The present diesel and natural gas engine line, the facilities and the manpower are all dedicated to give you the best diesel engine value on the market today.

We offer this value in new engines and the constantly improved diesel industry standards such as the D397 and D342. This value results from assembly line, mass-production economies, precision manufacture, 100% inspection, excellent metallurgical quality, modern, compact design, more than thirty years of diesel experience and a constant intent to offer engines at an economical price per unit of horsepower.

Whatever your diesel or gas engine needs may be, you can expect Cat to offer the most for a reasonable price, low operating cost and a low final cost.

Specify Cat and be sure of satisfaction.

CATERPILLAR

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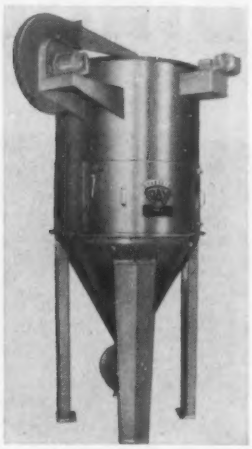
Engine Division, Caterpillar Tractor Co., Peoria, Illinois, U.S.A.

engine power
BY CATERPILLAR

Printed in U.S.A.

● An improved "RJ" dust filter has been added to the line of dust control equipment manufactured by the DAY Company.

The most basic design change is a simplified method for maintaining



the porosity of the filtering medium. The filter, with a combination of felted filter medium, and new high-velocity, counter-flow air action, permits high filtering rates (air to cloth ratios of 20 to 1) while operating at an efficiency of 99.99 percent. The simplified design and construction of the unit minimizes maintenance and reportedly increases filter life. The unit will filter fine, coarse, abrasive, or non-abrasive dusts. It is designed to handle air streams with temperatures up to 300 deg. F.

The "RJ" filter is available in five sizes, in capacities ranging from 285 to 6,400 c.f.m. (367)

● Hard-surfacing the flights of a screw-type conveyor with a paste overlay has increased conveyor life five to six times, according to the manufacturer, Industrial Machinery Company.

Colmonoy Sweat-On® paste, a suspension of pure chromium boride hard-surfacing crystals in a vehicle, is applied in a thin, even coat to the wearing surfaces of the conveyor flights. After the paste application has air dried, it is fused to the base metal by applying an oxyacetylene flame to the paste-coated surface as the screw is rotated. The paste application is not a true build-up. The part to which the paste is applied becomes hard-surfaced, rather, as a result of the *alloying* of its base metal with the paste. Penetration into base metal is two to three times applied paste thickness. (368)

● "Diesel Pep" has been added to the line manufactured by Spray Products Corporation.

The item is a combination of solvents, dispersants, oils, and other ingredients formulated to improve the performance of all types of diesel engines.

Reportedly it can keep injectors, screens, filters, and fuel pumps clean; improve combustion; disperse water; and keep fuel lines open. It will also prevent rust and acid formations; remove gum and varnish; reduce engine wear; eliminate deposits; and minimize smoking.

To use, the required quantity of Diesel Pep is added to the fuel tank at any temperature, and the engine is operated in the usual way. (369)

● The Model H-30 tractor-shovel —operating capacity, 3,000 lb., equipped with 1-cu. yd. (S.A.E. rated) bucket—has been added to the "Payloader" line manufactured by The Frank G. Hough Company.

The unit is powered with a 77½-hp. heavy-duty gas engine, which according to the manufacturer, provides more power than any other 4-wheel drive unit of this size and capacity. Clearance is 8 ft. 4 in. under cutting edge, dumping reach is 29 in. ahead of front tires. (370)

MASTER MECHANICS CORNER:

James Steele, Equipment Superintendent in charge of 27 machines for Hugh Steele Construction Company, Atlanta, Georgia, working on 6½-mile relocation of U. S. Route 29.

"On our D8Hs working in sand, clay and rocky conditions, Cat lifetime lubricated rollers are giving us 20% more wear as compared to old type rollers."

Caterpillar Tractor Co., General Offices, Peoria, Ill., U.S.A.

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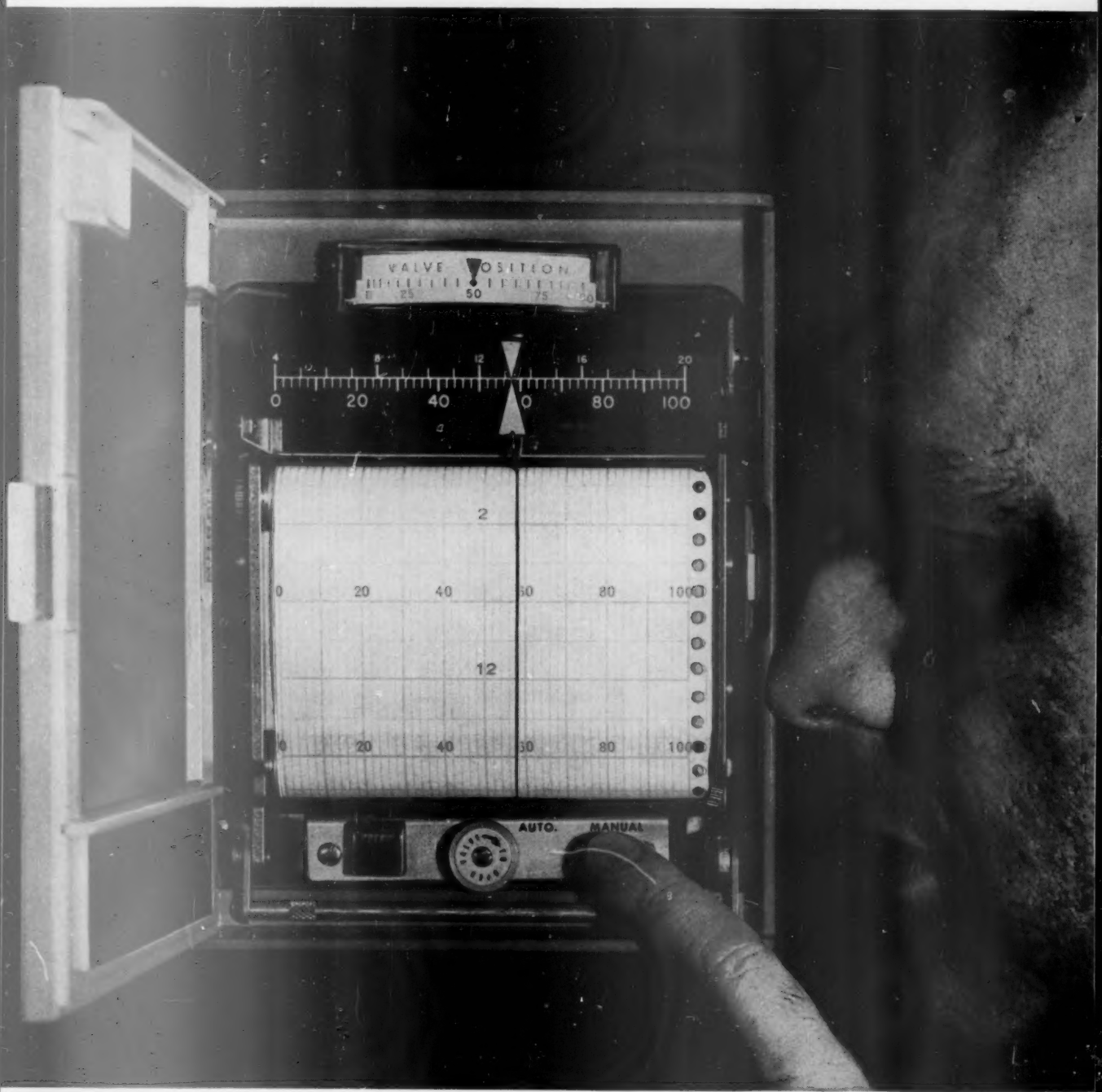
Enter 73 on card, page 257

New *ElectriK Tel-O-Set*... needs in a single compact



everything an operator control station

This Honeywell electric control station meets all of your requirements for operator convenience.

One compact case houses *every* function the operator needs to supervise a control loop: indication of process variable and set point on the same scale; the controls needed to switch from automatic to manual; controls for manual control; and indication of valve position.

The *ElectriK Tel-O-Set* control station assures easier bumpless transfer than ever before available because there's no need to "line up" or "match" pointers. A null balance indicator eliminates guesswork, and the transfer doesn't have to be hurried since the valve remains under control during the transfer.

You can also order the controller with the proportional band, rate, and reset adjustments on the front of the panel conveniently located below the control station, or at the rear of the panel.

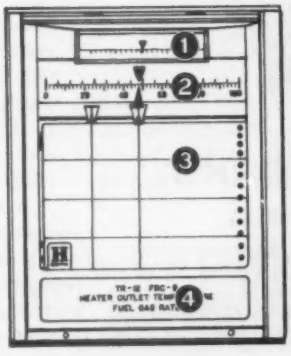
These are just a few of the features that make the new *ElectriK Tel-O-Set* control system an outstanding value. Your Honeywell engineer can give you complete details. Call him today . . . he's as near as your phone.

MINNEAPOLIS-HONEYWELL, Fall River, Massachusetts.

75th YEAR — PIONEERING THE FUTURE

Honeywell

H HONEYWELL — *First in Control* — SINCE 1885



1. Valve position indicator continuously indicates controller output when on automatic control.

2. Set point index is conveniently located on same scale as process-variable pointer; you can see from a distance any deviation of variable from set point.

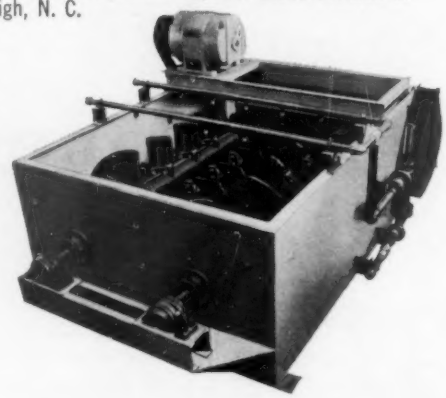
3. Rectilinear 4-inch calibrated chart is easy to read. At standard chart speed, four hours of recording is always visible. Unit has daily chart tear off or 30-day rewind. Both recorder and control station take the same 5½" x 6" panel cutout.

4. You get bumpless switching from automatic to manual control because you don't have to match pointers. In the balance position, the valve position indicator is part of a null circuit that compares controller output and manual output. When indicator reads 50%, both outputs are perfectly matched.

NEW Eagle Stabilized Road Base Mixer

Where mobility is required to keep the stabilized road base preparation plant close to construction sites, the Eagle Portable Base Mixing Unit is the answer. Semi-tractor positions the unit at the site. Then, hydraulically operated hoisting system quickly raises the entire unit to provide 9' clearance beneath the discharge gate of the 5 cubic yard bin beneath the mixer. Safety locking pins are then inserted in the four columns. Self-contained power unit—either electric motor or combustion engine—and V-belt drive. Totally enclosed gear drive runs in oil bath. Unit quickly made ready for travel. Thorough mixing provided of any road base materials. Stabilizing additives completely blended. Spray bars and flow meter provide addition of water in pre-determined amounts. Capacities: 125 to 900 tph. Eagle Portable Mixer shown is doing splendid job for Superior Stone Division of American-Marietta Co., Raleigh, N. C.

Eagle ECONO-MIXER with open bevel gear drive available for installation above storage bin or hopper in stationary set-up. Cast Ni-Hard paddles mounted on large diameter tubular steel shafts. Never before has such thorough mixing been available at such low cost per ton in such a sturdy "years-of-service" unit.



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SINCE 1872
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EAGLE IRON WORKS

EAGLE IRON WORKS

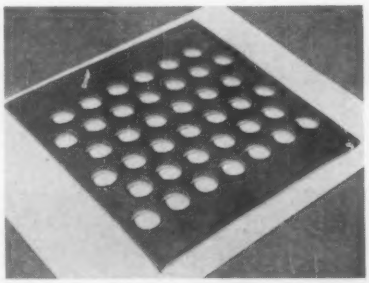
ENGINEERS • MANUFACTURERS

133 HOLCOMB AVE., DES MOINES, IOWA

MANUFACTURERS OF AGGREGATE WASHING AND CLASSIFYING EQUIPMENT, HMS PLANTS, DREDGING EQUIPMENT, PILE HAMMERS AND BREAKER BALLS.

Enter 76 on card, page 257

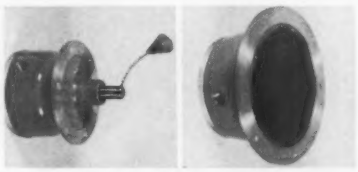
• Hendrick Manufacturing Company's rubber clad perforated steel screens are available in sizes up to ½-in. steel thickness and ¾-in. rubber covering. Recommended for ore and aggregate screening, they have a rubber cover which reduces plate wear and cuts screening costs. **(371)**



• Bin level controls, used for indication and control of all kinds of bulk materials, wet or dry, light or heavy, are available from the Sanilac Manufacturing Company.

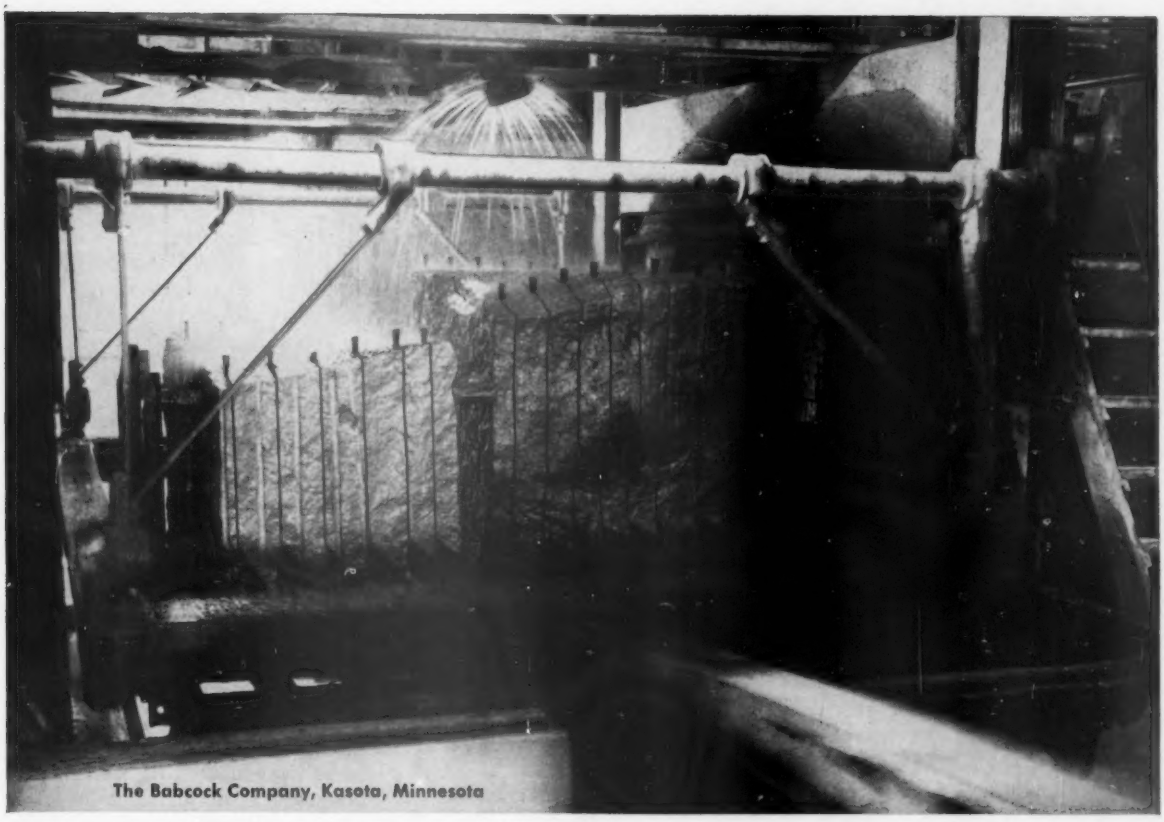
The Bin-O-Matic level controls can be connected to horns, relays, or lights to give warning of overloading, lack of materials, or such unusual conditions as plugging of a conveyor or pipe.

The Model 'M' rotating vane bin level indicator has a heavy-duty, 1 r.p.m. drive motor, and moisture-proof seals on the vane shaft.



The diaphragm-type bin level indicator switch is actuated to indicate the presence of material when material rises to cover the diaphragm. As the material falls away from the diaphragm the switch de-actuates, indicating no material. To change diaphragm, three screws are loosened, and the new diaphragm snapped in place.

A stainless-steel diaphragm frame with an O-ring seal is available for use on slurries, and wet or corrosive materials. Diaphragms in neoprene, Teflon, or canvas are also available. **(372)**



The Babcock Company, Kasota, Minnesota

Bearings Replaced Every 11 Weeks... New Trojan HM Grease Extends Life to 18 Months!

Four generations of Babcocks have been producing "Kasota Stone." Today, Babcock is the largest producer of fabricated natural stones west of the Mississippi.

But Babcock had been having a problem with equipment on an important step in its production. The connecting rod bearings on the gang saws were burning out in less than three months. Seven different competitive greases were tried on these bearings and they continued to show an average life of only eleven weeks.

Cities Service Lubrication Engineer, Ray Brooks, was consulted and he recommended new Cities Service Trojan HM Grease. New Trojan HM contains molybdenum disulfide that has a strong affinity to metal. This causes it to adhere to the bearing surfaces even after the other lubricant has been squeezed out or washed away. Babcock lost only one of the eight bearings on the gang saw in the next year and a half. And that bearing had nearly run out its life term with the grease that preceded introduction of new Trojan HM.

The operating conditions encountered in quarries demand more of lubricants than almost any other type of operation. Shock loads, extremes in outside temperatures, water, dust and other contaminants demand high quality lubricants to safeguard your equipment and keep production up. If you have a grease problem... want to extend the period between servicing . . . call your local Cities Service office for full information on new Cities Service Trojan HM grease. Or write: Cities Service Oil Company, Sixty Wall Tower, New York 5, N. Y.

Babcock's "Kasota" Stone can be found in buildings and monuments all over the United States.

Connecting Rod Bearing that formerly lasted only eleven weeks is now used for eighteen months and longer. Seven competitive greases were tried before New Trojan HM.

CITIES SERVICE

QUALITY PETROLEUM PRODUCTS

Labor Developments

(Continued from page 13)

bor dispute in which you were involved?

In responding to this question, it is permissible to exclude the following: (a) information for use solely in conjunction with an administrative or arbitral proceeding or a criminal or civil judicial proceeding, and (b) expenditures made to any regular officer, supervisor, or employee as compensation for services as a regular officer, supervisor, or employee.

QUESTION 5 — *During the past fiscal year did you make any agreement or arrangement with a labor relations consultant or other independent contractor or organization pursuant to which such person undertook activities where an object thereof, directly or indirectly, was to persuade employees to exercise or not to exercise, or as to the manner of exercising the right to organize and bargain collectively through representatives of their own choosing: or did you make any payments (including reimbursed expenses) pursuant to such an agreement or arrangement?*

In answering this question, it is permissible to exclude agreements or arrangements covering services related exclusively to: (a) giving you advice; or (b) representing you before any court, administrative agency, or tribunal of arbitration; or (c) engaging in collective bargaining on your behalf with respect to wages, hours, or other terms or conditions of employment, or negotiating an agreement or any question arising thereunder.

QUESTION 6 — *During the past fiscal year did you make any agreement or arrangement with a labor relations consultant or other independent contractor or organization pursuant to which such person undertook activities where the object thereof was to furnish you with information concerning activities of employees or of a labor organization in connection with labor disputes in which you were involved; or did you make any payments pursuant to such an arrangement or agreement?*

In answering this question, it is permissible to exclude agreements or arrangements to obtain information solely for use in conjunction with an administrative or arbitral proceeding or a criminal or civil judicial proceeding.

Responding to this questionnaire is not an easy task. As may be noted from the above discussion, the rules are not perfectly clear-cut. With respect to the making of payments or loaning money to labor union representatives, it would appear that any unusual payment made outside the usual course of business, except for Christmas gifts, ought to be reported in order to be on the safe side.

It will be far more difficult to determine whether it will be necessary to report other expenditures, such as those made to obtain information about the labor organization with which one does business.

For example, many employers subscribe to their union's publications. To be safe, it would appear to be necessary to report such expenditures since they do not come under the specified exclusions, namely, they were not expenditures for information to be used *solely* in conjunction with an administrative or arbitral proceeding or a criminal or civil judicial proceeding.

The same problem is involved in the hiring of labor relations consultants and attorneys. If their function is only to give you advice or to represent you before a court, administrative agency, or tribunal of arbitration or to engage in collective bargaining on your behalf, the expenditure need not be reported. If the language "giving advice" is broadly interpreted, virtually everything a labor relations consultant or attorney does for the firm is excluded. This is unlikely to be the interpretation because if it were so broad, it would make the requirement practically a dead letter.

It must, therefore, be assumed that a somewhat narrower interpretation will finally be given to this language. Here, again, prudence would dictate reporting as many of such expenditures as is possible. The difficulty, of course, is that these reports will become available for public scrutiny.

Thus, a very important part of the relationship between a client and his attorney or consultant becomes publicly revealed, namely, the size of the fees paid. These could be subject to substantial misinterpretation; and, in any event, if used out of context, they could be used as a weapon against the employer.

Every establishment is required to file one of these forms every year if any of these enumerated acts has been done. Careful thought must be given to: (1) whether to submit the report at all; and (2) exactly how to fill it in. Particularly since the report will be open to public inspection, it would be the better part of wisdom for each employer to think very carefully about the response to each of the questions and to consult with experienced lawyers and advisers in connection with the answers.

Inland Lime & Stone Co. Opens Sinter Sand Plant

Inland Lime & Stone Company (Division of Inland Steel Co.) has begun operations at its new sinter sand plant at Port Inland, Mich. Initial production of sinter sand limestone is of minus ⅛-in. size, which will eventually comprise about 10 percent of total production. The fluxing limestone will be used for steel making at Inland Steel's Indiana Harbor plants.

At Indiana Harbor, the sinter sand is combined with fuel (e.g., coal) and with finely-ground ore and charged in a sinter machine, which produces sinters or chunks similar to clinkers. These, in turn, are charged into blast furnaces.

EBER R. JAQUES, general sales manager of Consolidated Rock Products Company, Los Angeles, died unexpectedly on June 5. He had been stricken a few hours earlier with a heart attack. He was 53 years old.

Mr. Jaques operated his own building materials business after returning from service in the U. S. Navy in World War II. In 1951 he joined the staff of Consolidated. He became general sales manager in 1957.

JACK MOFFETT, a research chemist at the M. J. Grove Lime Company's plant in Frederick, Md., died on May 14 in a local hospital. He had suffered a heart seizure.

For a better profit picture...

CHECK EUCLID C-6 WORK-ABILITY

You'll find this new C-6 has the all-around tractor versatility needed for heavy construction, mine and quarry work. With five years of rugged field and proving ground test, this new crawler sets higher standards of performance on the toughest jobs for tractors in the 200 h.p. class.

Here are just a few advantages you get in the C-6 . . . a dependable GM 6-71 engine delivering 211 net h.p. to the power train . . . a proven Torqmatic Drive that provides full-power shift and cuts cycle time . . . fast-as-a-fox maneuverability . . . almost unbelieveable ease of handling . . . accessibility for servicing that pays off in more productive time on the job. It responds like nothing you've ever touched!

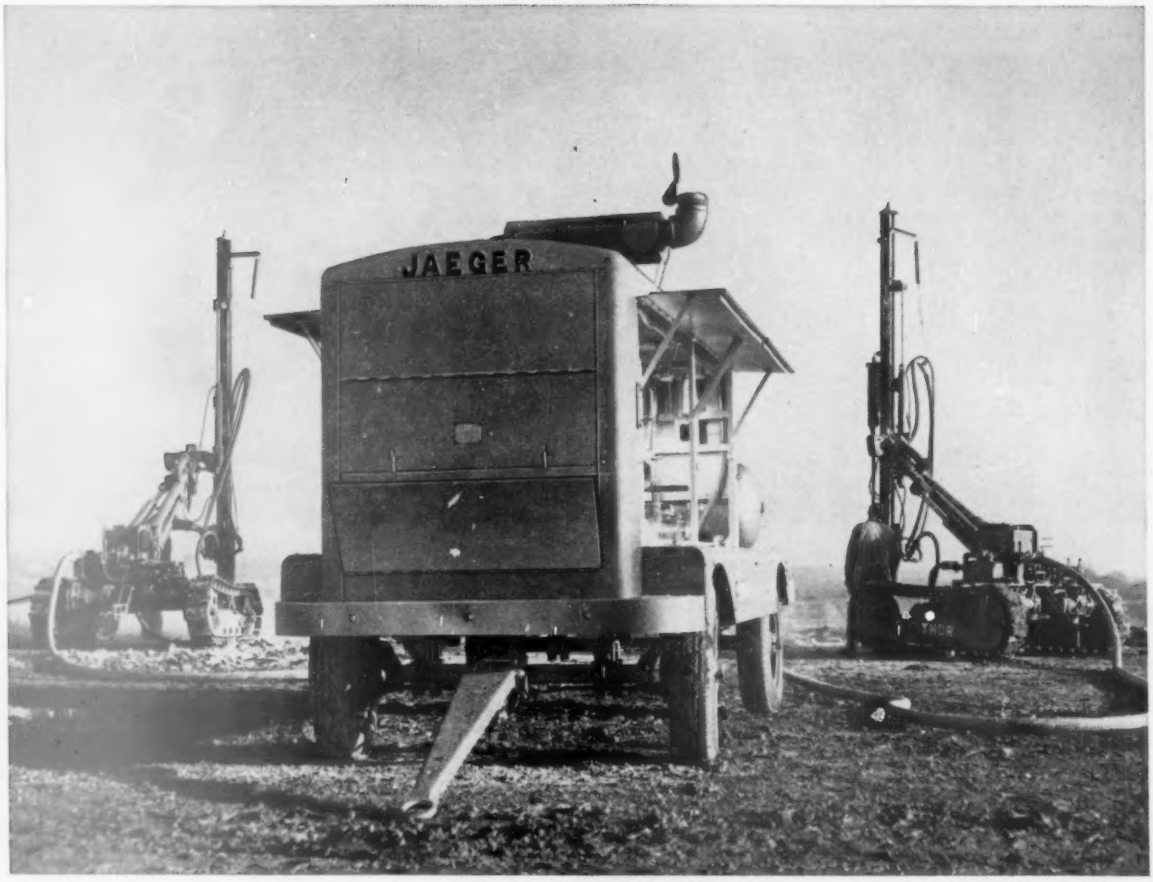
Have your Euclid dealer give you all the facts on the C-6 . . . he'll show you why this new "Euc" belongs in your spread . . . why it's your best equipment investment.

EUCLID Division of General Motors • Cleveland 17, Ohio

GM GENERAL MOTORS EUCLID

EUCLID EQUIPMENT

FOR MOVING EARTH, ROCK, COAL AND ORE



THE JOB was drilling 3″ holes to 25′ depth, in limestone so hard the insert carbide bits had to be reground after every 48′ to 50′ of drilling.

THE TEAM is a Jaeger "900" rotary compressor behind two Thor TR-5 air-and-hydraulic crawlers with 4½″ drifters.

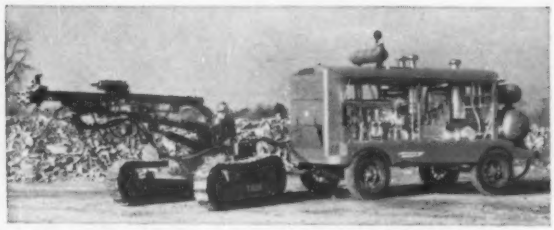
FOOTAGE AVERAGED 2′ per minute (1′ per drill), the rate varying with the ledge strata.

A NOTABLE ECONOMY was in the fuel-saving, engine-saving speed of the compressor. *It maintained 100 psig at the drills without ever running faster than 1400 rpm.*

World's slowest running "900" compressor powers today's fast drilling team

JAEGER DELIVERS MORE AIR FROM SAME HORSEPOWER

Jaeger "900" uses the same GM 6-110 Diesel as other "900" compressors, but delivers its rated capacity at 100 rpm slower speed — 1700 instead of 1800. Its fuel factor is more than 500 cu. ft. of delivered air per pound of fuel consumed. The engine lives longer because it takes it easier throughout its operating life. Compressor life is longer, too. 8000 hours without a vane replacement is not unusual. Ask any Jaeger owner; ask your Jaeger distributor — or send for new Catalog JC-O.



Air-and-hydraulic drill adapts to any desired position. Drill and compressor make a self-powered mobile "team".

THE JAEGER MACHINE CO., 602 Dublin Ave., Columbus 16, Ohio

Jaeger Machine Co. of Canada, Ltd., St. Thomas, Ontario

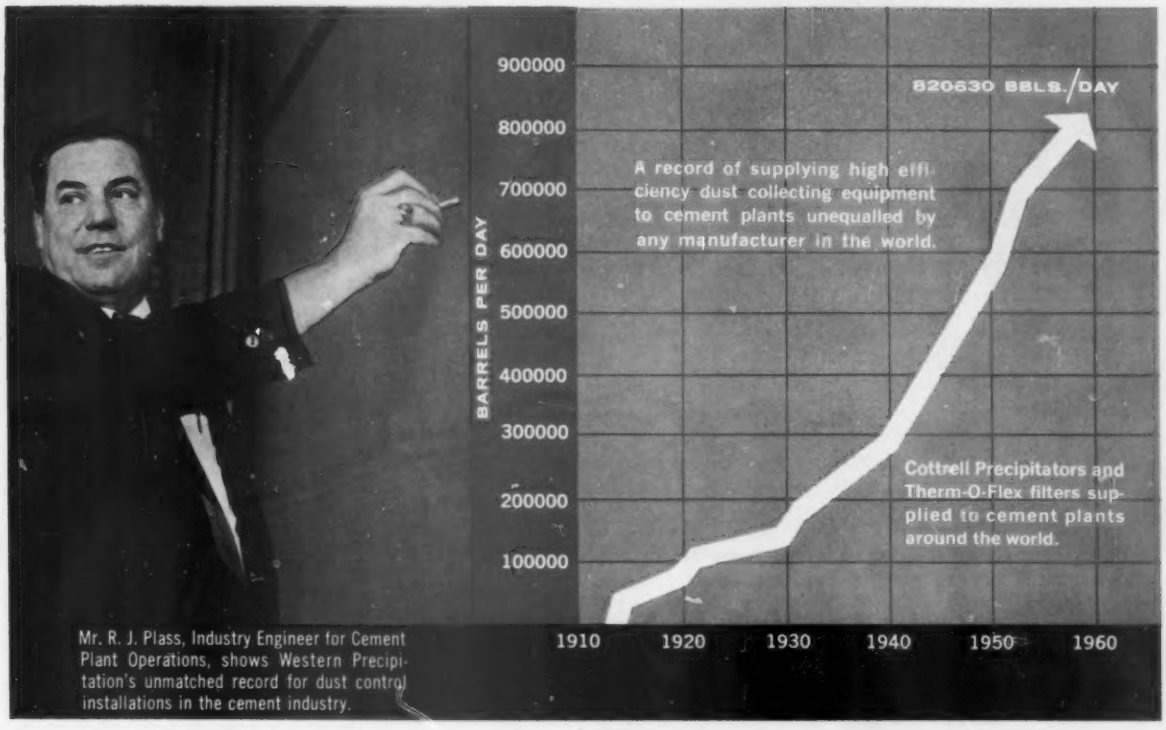
PUMPS • MIXERS • TRUCK MIXERS • PAVING MACHINES

Enter 80 on card, page 257

A WORLD-WIDE "EXPERIENCE RECORD"
UNEQUALLED IN THE ENTIRE CEMENT INDUSTRY!

Since its first cement plant installation almost a half-century ago, Western Precipitation has installed dust collection equipment on cement plants with a combined operating capacity of over 820,000 barrels per DAY... a record for wide-range experience, for customer satisfaction and overall "know-how" of kiln dust control that is unequalled in the entire industry!

Not only is this a testimonial to the reliability of Western Precipitation equipment (for the major percentage of these installations were repeat orders from satisfied customers) but it is also an indication of the way Western Precipitation equipment has kept pace with new processes and new advancements as they have been adopted by the cement industry.



Mr. R. J. Plass, Industry Engineer for Cement Plant Operations, shows Western Precipitation's unmatched record for dust control installations in the cement industry.

Regardless of your type of operations, Western Precipitation engineers can provide an unbiased evaluation on the type of equipment best suited to your particular requirements—an evaluation backed by the industry's top organization in cement plant dust control!

"Cottrell" Electrostatic Precipitators—the equipment pioneered by Western Precipitation for high efficiency, long life electrostatic separation of dust particles from gas streams.

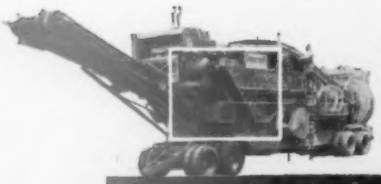
"Multiclone" Centrifugal Collectors—the multiple small-tube mechanical collectors pioneered by Western Precipitation for high-efficiency, low maintenance centrifugal separation of dust particles from gas streams.

"Therm-O-Flex" High Temperature Filters—the woven glass filter systems that handle gas inlet temperatures as high as 600°F. and feature new type silicone-treated filters that can be cleaned automatically without destructive shaking or high-frequency vibration.

▶Write for descriptive literature on Western Precipitation's equipment for kiln dust collection!

WESTERN
PRECIPITATION
DIVISION OF JOY MANUFACTURING COMPANY
1000 WEST 9TH STREET LOS ANGELES 54, CALIFORNIA
NEW YORK 17 • CHICAGO 2 • PITTSBURGH 2 • ATLANTA 5 • SAN FRANCISCO 4
IN CANADA: 8285 MOUNTAIN SIGHTS AVENUE, MONTREAL, P. Q.

Cottrell Precipitators	Multiclone Dust Collectors	Therm-O-Flex Hi-Temp Filters	Dualaire Reverse-Jet Filters	Turbulaire-Doyle Scrubbers	Joy Microdyne Scrubbers	Combination Units	Holo-Flite Processors	Hi-Turbiant Heaters



Cedarapids Super Commander Portable Crushing and Screening Plant, built by Iowa Manufacturing Company, Cedar Rapids, Iowa, produces up to 500 tons of material per hour.

This high capacity V-Belt Drive handles 60% more power in 30% less space!

Gates Super HC V-Belts solve product-development problem!

Iowa Manufacturing Company was faced with a problem: Transmitting 400 hp from a higher-speed engine in a space that had been just enough for conventional V-belts carrying 250 hp.

At higher speeds, centrifugal force made larger sheave diameters impossible. A wider span of belts was ruled out by Highway Department restrictions of overall machine width to eight feet.

Iowa Manufacturing's designers solved their primary problem of transmitting 60% more horsepower with new Gates Super HC V-Belts.

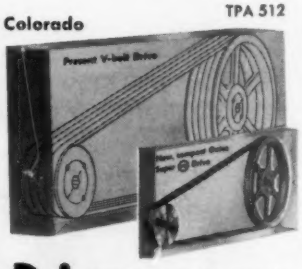
Because Super HC V-Belts have smaller cross section, use narrower and lighter weight sheaves, designers also succeeded in reducing drive weight, width and height—a decided bonus in portable equipment.

Nation-Wide Engineering Service

A Gates Distributor can show you how sheave diameters can be reduced 30% to 50%, drive space up to 50%, and drive weight 20% or even more with Super HC V-Belt Drives. Ask him for your free copy of "*The Modern Way to Design Multiple V-Belt Drives*", or write to The Gates Rubber Company Sales Division, Inc., Denver, Colorado.

The Gates Rubber Company, Denver, Colorado
Gates Rubber of Canada Ltd., Brantford, Ontario

TPA 512



Gates

World's Largest Maker of V-Belts

Gates Super HC V-Belt Drives same hp capacity in smaller "package"

Enter 82 on card, page 257

Washington News Letter

(*Continued from page* 11)

political campaigns. Around Washington it is said that Americans must be made to take some of these issues seriously.

This really means that if there is no issue which, by its own weight, will attract the attention of most of the voters, it will be necessary to develop one.

Obviously, the issue of international relations is the outstanding one. The problem is how to make its significance clearly evident to large numbers of voters who have no direct contact with it. This was not the problem when unemployment and war, with which virtually every citizen had some direct relationship, were the issues. By now it has been pretty well demonstrated that talking about international problems is not enough to achieve real understanding.

On the other hand, it is obviously impossible to send each American around the world to see for himself the wide discrepancies between his income and welfare and that of the citizens of countries which are threatening his security.

The only alternative appears to be the use of the mass communication media, particularly television, to do the job. Some thought is being given to this possibility in official circles, although the movement is still very weak. Federal funds are being spent to send information about our country into other countries, but nothing is being spent to acquaint Americans with conditions abroad. This, no doubt, would be a very difficult matter. However, without communication, no real understanding is likely to be gained; and without real understanding, it is unlikely that any solution of the problem can be worked out.

Thus, during this hot July, Washington will be, more than ever, the focal point for the expression of the nation's uncertainties. The atmosphere is one of benig continually on the alert for unexpected developments which may arise in either foreign capitals or in the cities where the major parties are holding their political conventions. What happens in one area will undoubtedly affect what happens in the other.

Enter 83 on card, page 257 →

New Conveyor System

. . . gives far greater belt life

. . . reduces maintenance

. . . and you get it *exclusively* from McNally Pittsburg

A completely new Cradle Idler* is the key to this high-efficiency McNally Pittsburg conveyor design. By mounting new 5" rubber rollers on a *nonrotating*, stainless steel rope, dangerous harmonics and "loping" are eliminated—permitting greater capacity and faster belt travel with minimum spillage. The *true catenary* of this suspension provides uniform belt support with no bends or creases—belt life is substantially increased.

Because of the unusual simplicity of this new McNally Pittsburg conveyor design, installation costs are lower—and maintenance costs are at a minimum.

*Patents Pending

New shock absorbing 5" rubber rollers have precision ground ball bearings, prelubricated and lifetime sealed.

With true catenary suspension, belts stay flat; support is uniform under all conditions for far longer belt life.

On-the-job construction is simple. The entire conveyor uses standardized components for easy assembly to fit your particular needs.

WRITE TODAY for details on this new McNally Pittsburg conveyor which costs less to install . . . saves money every day it is in use.

McNALLY PITTSBURG

McNally Pittsburg Manufacturing Corporation—
Manufacturing Plants: Pittsburg, Kansas • Wellston, Ohio
Engineering and Sales Offices: Chicago • Rio de Janeiro
Pittsburg, Kansas • Wellston, Ohio

McNally Pittsburg Mfg. Corp.
Dept. P
Pittsburg, Kansas

☐ Please send information on the new McNally Pittsburg belt conveyor.

☐ Have Sales Engineer call for further consultation.

Name_____ Title_____

Company_____

City_____ State_____

ADVANCED PLANT DESIGN STANDS 11-YEAR TEST FOR LOW COST PRODUCTION

Half-mile long Barber-Greene belt conveyor system runs on original idlers, cuts handling costs at Elmhurst-Chicago Stone Co. plant

"Our maintenance cost per ton on the Barber-Greene conveyor system has been extremely low for 11 years, and not a single carrier has been replaced," says an Elmhurst-Chicago Stone Co. official. "We have been so satisfied with the operation of our Barbers Corners plant that we've virtually duplicated this layout at our Warrenville plant," he comments.

Hailed as an industry showplace when it started operation 11 years ago, the Barbers Corners truck shipping plant is still a model for low-cost production of sized aggregates.

Today, only two men are required to operate the plant. One directs production of concrete building aggregates, and a second man handles facilities producing asphalt mix aggregates.

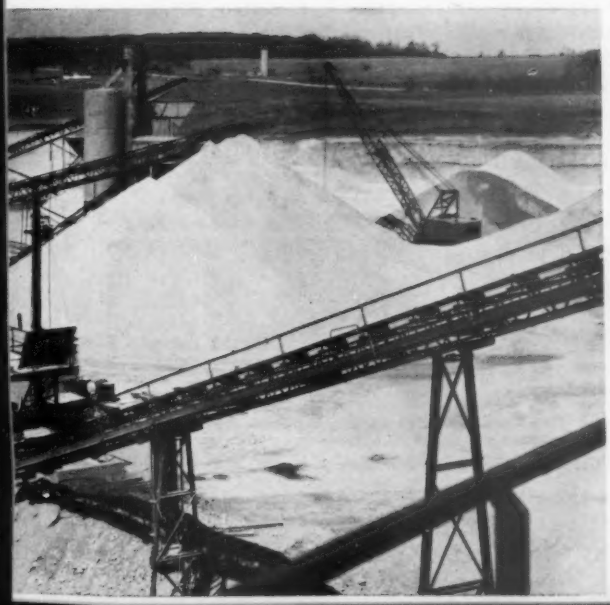
Elmhurst-Chicago Stone Co. has been an aggregate producer for 77 years, and is currently operating four plants in the Chicago area.

Get this same lowest-cost-per-ton solution to your material handling problems by calling in your Barber-Greene Conveyor Specialist. He sells pre-engineered standardized conveyors plus 40 years of experience in designing and building specially engineered systems—a preferred combination throughout the industry.

Barber-Greene stackers are used both to fill truck-loading bins and to build stockpiles. All are power-propelled and operated by remote control.

Fully mechanized crushing, washing, and screening plant shows how Barber-Greene belt conveyors move materials through each phase of processing.

Aerial view of Barbers Corners plant shows how six Barber-Greene radial stackers build huge circular stockpiles that allow maximum storage capacity in minimum space.



SEND FOR NEW IDLER BULLETIN

New 44-page Idler Bulletin describes the more than 800 units available in the complete Barber-Greene line, tells how their years-ahead features bring longer life and greater economy to every job. Ask for your copy today.

Your belt conveyor equipment headquarters

Representatives in Principal Cities of the World

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CONVEYORS • LOADERS • DITCHERS

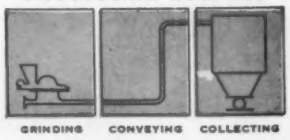
ASPHALT PAVING EQUIPMENT

Enter 84 on card, page 257

What does your DUST cost per pound?

If your present dust control system is not delivering maximum efficiency, you may be paying an exorbitant price for dust. It's a mighty expensive item when you consider the damaging effect on equipment, on employee morale, on general plant appearance and community relations. The most practical and *economical* solution of any nuisance dust problem is the MIKRO-PULSAIRE Collector, now available in new flexible modular units designed to meet any required capacity however large or small . . . attested recovery efficiency 99.9% plus . . . absolutely no moving parts, internally or in the gas stream . . . 4 or 5 times the capacity of conventional bag houses per unit of cloth area. For the toughest nuisance dust collection jobs, call on our engineering staff, and the MIKRO-PULSAIRE.
Ask for Bulletin 52A-1.

PROCESSING SYSTEMS



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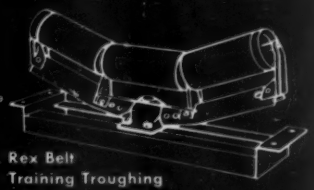
REX® Conveyor components

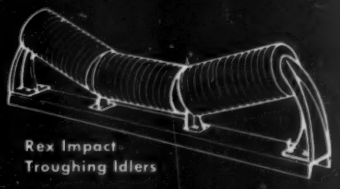
Complete line of idlers and pulleys Rex-Rated for every type of service

Rex Troughing Idlers

Rex Return and Flat Idlers

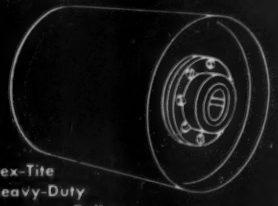


Rex Belt Training Troughing Idlers

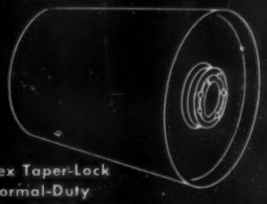


Rex Impact Troughing Idlers

Rex Spiral Return Idlers



Rex-Tite Heavy-Duty Conveyor Pulleys



Rex Taper-Lock Normal-Duty Conveyor Pulleys

to the salt mines...FOR LIFE

There's just one reason why Rex-Rated Idlers were sent to the salt mine shown above...International Salt Company knew in advance that these idlers would provide maximum service life under punishing corrosive conditions and continuous heavy loads. Years of service have proved the decision was right. Down time has been kept to a minimum.

The main reason why Rex-Rated Idlers eliminate guesswork and costly selection errors is because the Rex-Rated line is complete with idlers for every application. And every Rex Idler is accurately rated to provide exactly the operating life required under specific operating conditions. A simple selection chart tells you in advance exactly which idler you need and what kind of service to expect before you buy.

The Rex Rating System and the Rex line are the results of years of experience in idler design and testing by Rex Engineers.

Why risk costly errors? Specify Rex-Rated Idlers. Write CHAIN Belt Company, 4604 W. Greenfield Ave., Milwaukee 1, Wis. In Canada: CHAIN Belt (Canada) Ltd., 1181 Sheppard Ave. East, Toronto.

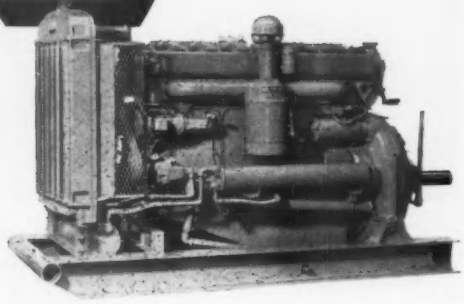
REX®

CONVEYOR SYSTEMS AND COMPONENTS

Two letters to remember in diesel engines and generator sets...

THE MP SERIES

MURPHY DIESELS



Here's the **MP** *Series Line-up*

MP SERIES ENGINES AND POWER UNITS—105 HP to 320 HP, 1200 and 1400 RPM.

MP SERIES DUAL FUEL ENGINES—also available.

MP SERIES GENERATOR SETS—60 KW to 188 KW.

MP SERIES MECH-ELEC UNITS for delivering mechanical or electrical power separately or simultaneously.

MP SERIES MARINE ENGINES AND AUXILIARIES—105 HP to 315 HP.

The 48-page booklet entitled "Before You Power a Job . . ." gives detailed information on MP Series Murphy Diesels. Ask your Murphy Diesel Dealer for a copy, or write direct. There's no obligation.

Deliver More Power Into the Job to Make More Profit for You

The power put into the job—not the power on the job, is the power that pays off for you. Engine reaction to load changes and speed changes determines the power that actually goes into the job. Only an engine with high rising torque can put more power into the job when needed.

MP Series Murphy Diesel engines are designed and built to deliver More Power into the job—the kind of *usable, hard-working power* you need. With high rising torque, they have the ability to take hold of a load and really hang on. This helps keep your equipment at the right operating speed for efficient production and More Profit. And remember, each day's production is determined by the *total power* put into the job that day.

To put MP Series Murphy power in your job, put Murphys on your job. You'll see the difference in your profits. Ask your Murphy Diesel Dealer for full information on the MP Series today.

MURPHY DIESEL COMPANY

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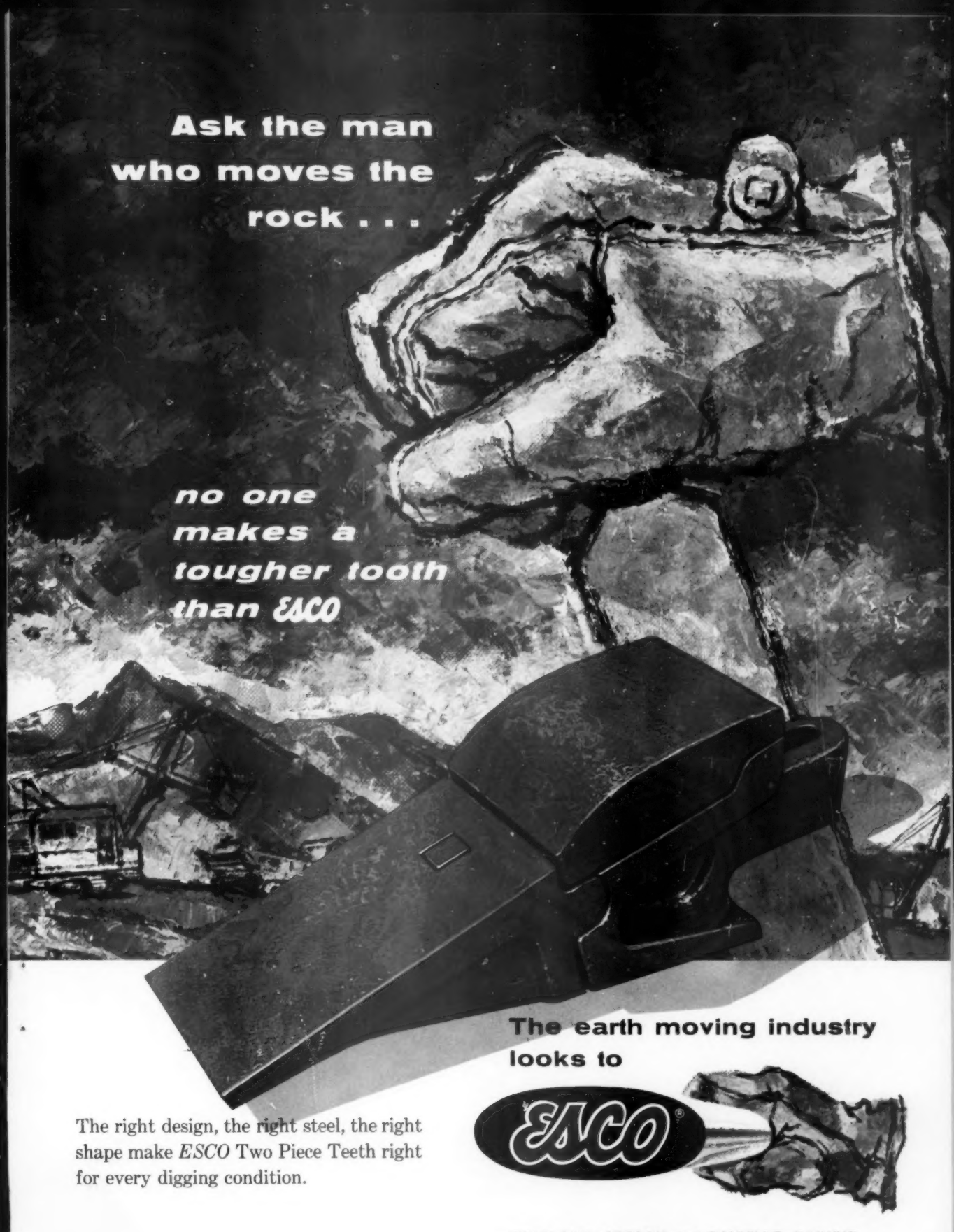
MURPHY DIESEL

Sales, service and parts throughout the nation



The right design, the right steel, the right shape make *ESCO* Two Piece Teeth right for every digging condition.

The earth moving industry looks to

ESCO®

PORTLAND, OREGON and DANVILLE, ILLINOIS

See reverse for shapes and size range >

Here are the points to remember...

Each easy-to-change ESCO Point is Brinell tested to assure exactly the right degree of shock-absorbing toughness and abrasion-resisting hardness for longer life. Abrasion resistant Wear Caps (illustrated) extend adapter life.

12M ALLOY STEEL

ESCO 12M Two Piece Teeth are the toughest you can use. Developed through years of research for the earth moving industry, cast *ESCO* 12M is the finest steel made for severe shock and abrasion.

ESCO TWO PIECE TEETH

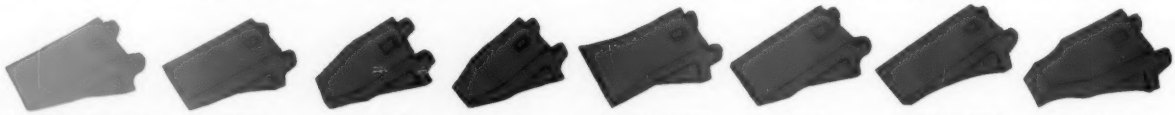
for all your digging equipment

Your *ESCO* dealer can supply two piece teeth for all your equipment. Consult him about standardizing on *ESCO* teeth for the added advantages of quantity purchasing and reduction of on-the-job inventories.

8 POINT TYPES FOR EVERY DIGGING CONDITION

WEAR CAP ADAPTERS

The ESCO Wear Cap Adapter, winner of the Blue Ribbon Mining Award, is the most rugged tooth assembly ever developed for handling tough rock and taconite. Replaceable wear caps sharply increase service life by protecting the adapter from wear. No special pins or welding required.



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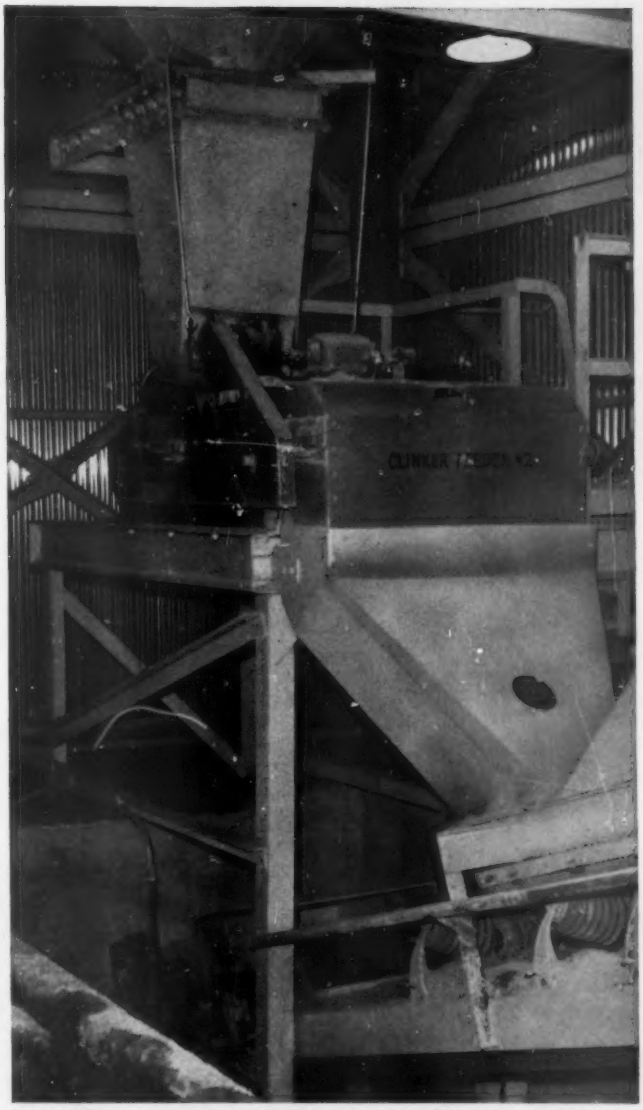
JEFFREY Weigh-Feeding helps achieve peak efficiency in new cement plant

Arkansas Cement Corporation in Foreman, Arkansas has one of the nation's most modern and highly automated cement plants. Designed and built by Kaiser Engineers of Oakland, California.

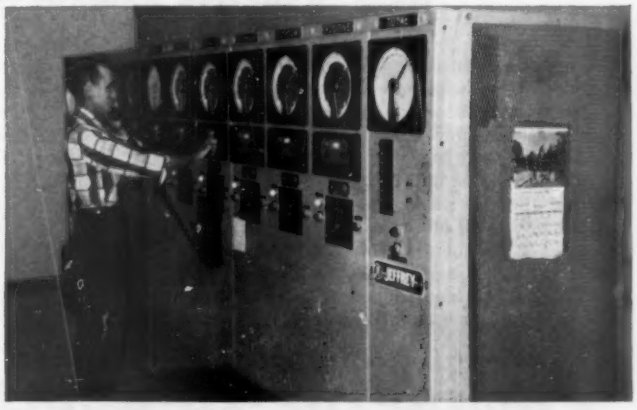
JEFFREY WAYTROLS®—machines which weigh materials as they feed them—were integrated into the automated system for handling the dry raw materials. These units continuously and automatically proportion by weight and feed materials to the various functions in the mill building. Complete instrumentation of this feeding equipment permits immediate adjustments as required in processing.

If you're interested in automating your conveying and processing operations and lowering costs, it will pay to consult Jeffrey. For information, write The Jeffrey Manufacturing Company, 917 North Fourth Street, Columbus 16, Ohio.



Jeffrey Waytrols like this one continuously proportion and feed chalk, iron ore, additive materials, clinker and gypsum at the huge Arkansas Cement plant; capacity is 1,400,000 barrels per year of Foreman Portland Cement and similar products.

One of two panels of Jeffrey instruments from which feed rates of individual Waytrols are controlled. Total feed rates can also be adjusted for over-all-mill control.



JEFFREY

CONVEYING • PROCESSING • MINING EQUIPMENT...
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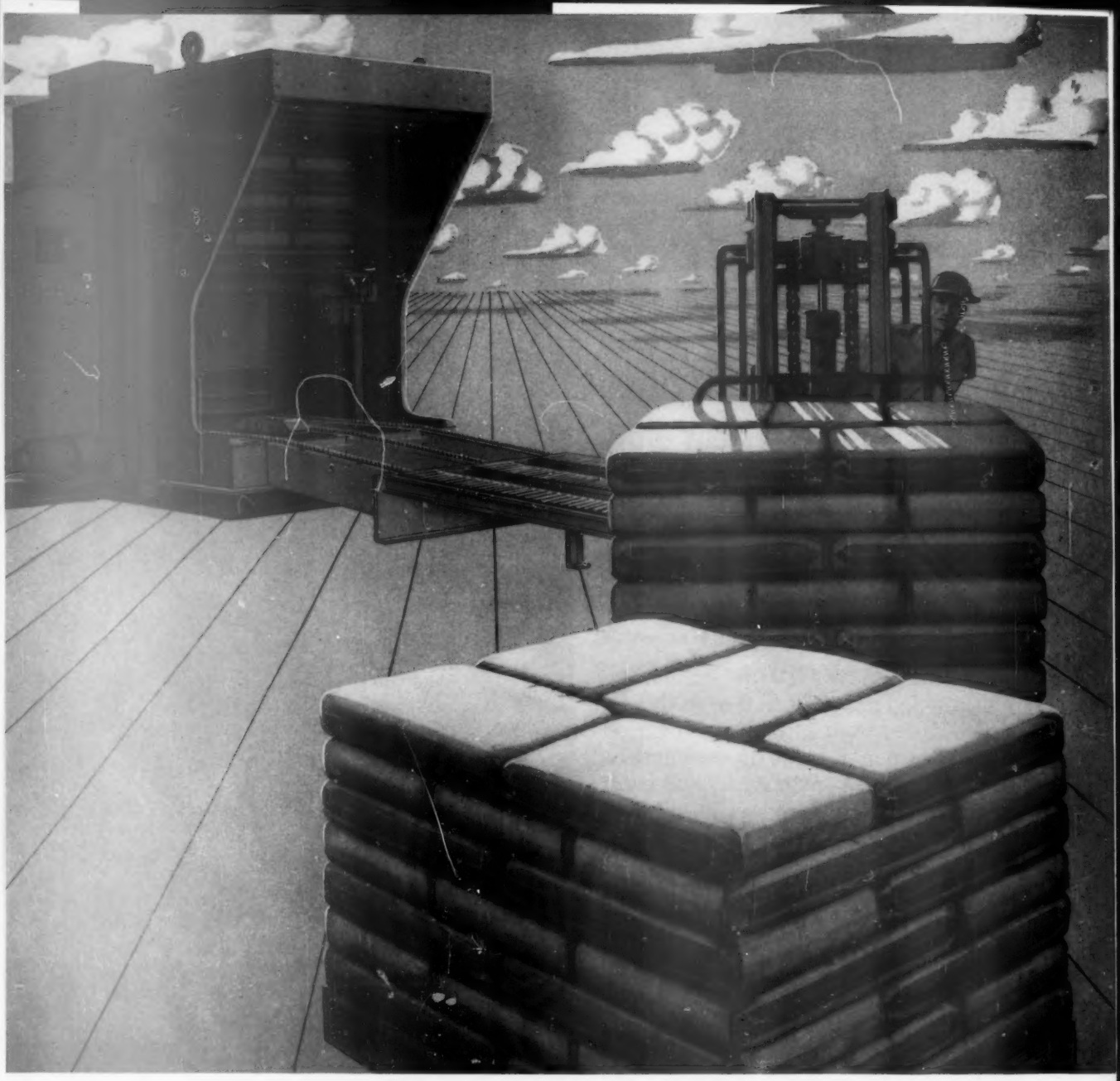


Now—palletize cement bags automatically!

The cement industry's *first* automatic bag palletizing system was installed recently at the Riverside Cement Company, in California. Riverside can now offer its customers faster, smoother, cleaner bag packing, loading and shipping—at less cost for labor.

This automatic bag palletizing system was developed and installed by packaging equipment engineers from St. Regis®, the Lamson Corporation and Riverside. It operates at speeds up to 25 bags a minute, with five bags to a tier. Selectors permit Riverside to build from five to eight tiers per load, depending on customer requirements. Riverside's palletized shipments have increased since installation of the new loader from 5 to 40%!

This success with automatic palletizing at Riverside, together with similar installations in other parts of the country, marks a major step forward in the industry. However, conversion to such an operation requires careful planning and a wealth of materials-handling knowledge. Our Bag Division Packaging Engineers have this experience and will work with your engineers and production staff to design your automatic palletizing system.

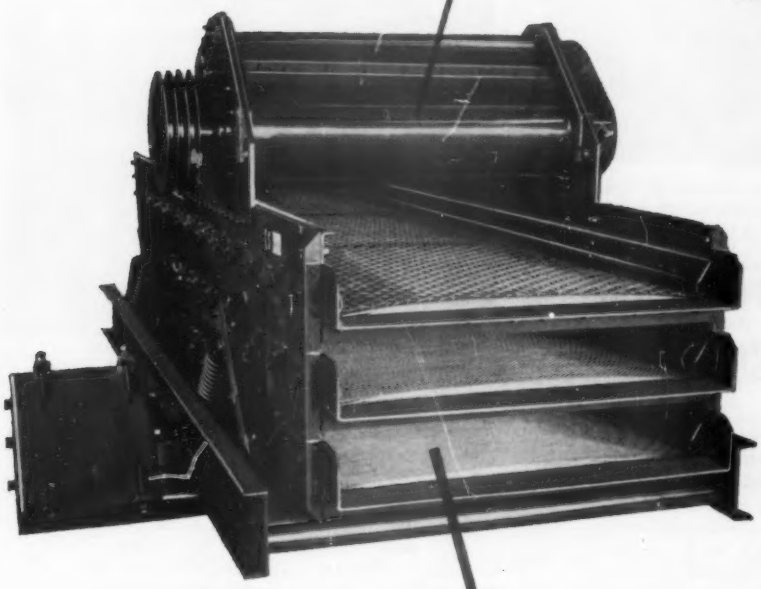
This is St. Regis *Packaging-in-Depth* in action—a complete bag service available from 13 manufacturing plants and 33 sales offices across the country.

Packaging-in-depth by St.Regis BAG DIVISION PAPER COMPANY

NEW SIMPLICITY HORIZONTAL VIBRATING SCREEN

• CONVEYS AND SCREENS material in mining and gravel plants where minimum headroom is a problem

Simplicity Engineering Company has built a new horizontal vibrating screen, Model OA-95, designed to operate in mining and crushed stone plants where headroom is the governing factor. In this type of operation, it is necessary to both convey the oversize material and screen the undersize material. To do these two jobs successfully, the rugged shaft assemblies have two full length, cast alloy off-set shafts. These counter-rotating shafts, geared together, with heavy duty precision bearings that run in oil, provide the extra power needed to operate large screen areas on an efficient basis.



The Model OA-95 is equipped with a straight line deck designed to withstand the punishment of severe impact and loading stresses. The one-piece deck has all-welded construction and is stress relieved in an electric furnace to insure greatest strength and durability.

Available in sizes from 4′ x 10′ to 4′ x 16′, the new, 3-deck screen can be quickly converted to a two-deck unit by removing the center deck.

For complete information on the OA-95 Horizontal Vibrating Gravel Screen and other screening equipment, scalpers, feeders and feeder grizzlies manufactured for the gravel and mining industries, write to Simplicity Engineering Company.

Simplicity
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221

Overall view of plant showing huge mounds of sand conveyed by U. S. Giant "EN" cotton-nylon belts.

Close-up of gravel surge piles and two U.S. Giant "EN" conveyor belts.

U.S. Belts cement profits for contractor and sand-gravel men

In the latter half of 1958, sand and gravel were required to build a breakwater in the bay of Bellingham, Washington. The successful contractor would have had to barge this from the nearest source, 100 miles away.

However, local men in the concrete-products business, always in need of sand and gravel, knew of a sizable deposit nearby. If only they could work this deposit, furnish the contractor with material at a considerable saving to him in time and money and end up with a plant to supply their own and local needs!

The capital outlay would have been prohibitive unless material-handling costs were cut to the bone. U.S. Rubber was brought into the picture to design a conveying system to meet these needs.

Ten conveyor belts were erected for the plant. Each was equipped with U.S. Rubber's Giant® "EN" cotton-nylon belts. They far exceeded in load-carrying capacity and high rip resistance any belt of conventional duck construction.

The plant utilizes the following belt conveyors:

1420 feet 18" 4-ply TN, ⅛" x 1/32" covers
1875 feet 30" 5/EN, ⅛" x 1/32" covers

These belts have more than fulfilled expectations. They conveyed the thousands of tons of sand and gravel needed to complete the breakwater. This was in 1958... and so far are continuing to carry thousands of tons of sand and gravel for local needs to customers in a 75-mile radius, including Port Angeles, Port Townsend, Anacortes, Wash., and Vancouver, B. C., Canada, thereby repaying the investment.

All of which proves again that "U.S." is the foremost authority in conveying materials by belts.

US RUBBER

Mechanical Goods Division

United States Rubber

WORLD'S LARGEST MANUFACTURER OF INDUSTRIAL RUBBER PRODUCTS

Rockefeller Center, New York 20, N.Y. In Canada: Dominion Rubber Company, Ltd.

The Editor's Page

Are You Under-insured?

THERE are many things about this great nation of ours of which we can be proud, but our fire record is not one of them. We have made great progress industrially and in the provision of modern housing and educational and recreational facilities for our people. But we have made little impression on the terrific toll taken annually by fire. Fire losses affect us all, directly or indirectly, but we have done little to prevent them.

If past experience is any guide, total fire losses of all sorts in 1960 will be in excess of $1 billion for the fourth year in a row. There will be about 2,000,000 fires. More than 280,000 homes will be partially or completely destroyed by fire and a staggering number of businesses will be similarly affected. Worst of all, many thousands of lives will be lost.

OF these predicted fires only a few can be listed as due to natural causes, such as lightning. Almost all will be due to carelessness, ignorance, or indifference, and could be prevented by the exercise of a little care and forethought.

It should be a matter of great concern to management that a large proportion of property owners either have no insurance or are under-insured. Most businesses, in case of fire, would suffer a total or near-total loss and most of them would be unable to rebuild and get back into business because of inadequate financial resources. The failure to carry business interruption insurance is often a serious omission, but the failure to carry adequate property insurance against fire and other hazards is the major contributory factor.

THERE are several reasons that so many industrial establishments are not insured at all. Lack of funds is often responsible, although it would seem that in such cases the need for such protection is greatest. Often it is the result of neglect on the part of management or lack of interest in the insurance program—failure to foresee the possible consequences and to take steps to prevent them. It may even be due to the press of seemingly more urgent and important business problems.

The tendency to be under-insured exists to some extent for the same reasons, but it is usually due to the fact that current values far exceed original investment. Inflation is the major contributing factor. Insurance men say that book records are usually incomplete, and substantial expenditures for replacements, improvements, etc., are not accounted for. The accounting classifications of property rarely fit the insurance specifications, and the costs of the insured and uninsured portions of the property are rarely segregated. Information is seldom given on building location, data which is necessary in preparing a proof of loss.

There is no available information on the fire record of the nonmetallic minerals industry, but it can be safely assumed that it is about the same as that of industry as a whole. This means that there are some plants which are not insured at all and many, perhaps a majority, that are seriously under-insured. Producers would do well to study their individual situations and then take the necessary steps to prevent financial loss or even ruin in case of a fire.

Walter E. Trauffer

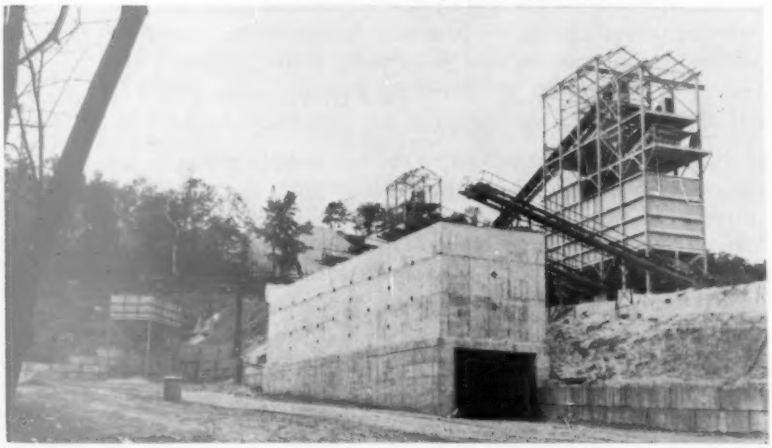
New $1,000,000 Canadian Crushed Stone Plant

has centralized remote control, maximum flexibility of blending

By WALTER E. TRAUFFER

The primary crusher installation with its apron feeder, and conveyors and bins for loading out road rock. The conveyor at the far right goes to the secondary crushers.

Below: Truck-loading facilities include two 120-ton steel bins (background) for crusher run and five 360-ton concrete bins (foreground).

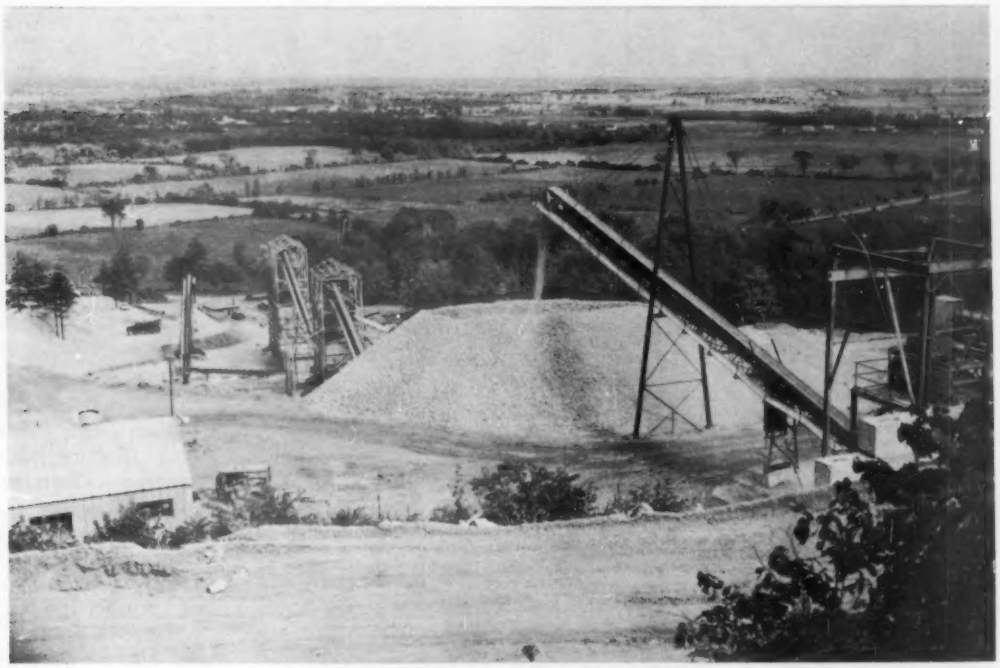


ANOTHER ON THE SPOT report

A NEW $1,000,000 crushed stone plant with a number of unusual and interesting features is that of Milton Quarries Limited, just outside of Milton, Ont., about 20 miles west of Toronto.

Designed for a capacity of 275 t.p.h., this plant has now been expanded to produce 400 t.p.h. Its outstanding feature is the centralized system of remote control from the plant feed storage pile through to the loading bins and stockpiles. This includes the use of ten electric vibrating feeders under the plant storage bins for maximum flexibility in blending and loading straight or blended sizes. Interesting also is the use of gyratory reduction crushers (French) which can be started or stopped under load.

The sequence of events leading up to the building of this plant is unusually interesting. Charles A. Poynton, now sales manager of the company and a director, had investigated this deposit in 1927, when he was an independent professional engineer and geologist. Nothing was done with it, however, until 1957, when plans for a new superhighway (No. 401) were announced. At that time Mr. Poynton remembered



This view from the quarry level shows the secondary crushing station, with the boom belt conveyor to the 10,000-ton plant-feed surge pile at Milton Quarries.

that this deposit was close to the highway, giving quick access to the metropolitan area of Toronto.

As a result, Milton Quarries Ltd. was formed as a subsidiary of Macassa Mines, to build and operate this plant. The parent company operates gold and uranium mines in Canada, and this is its first nonmetallic minerals venture. The Milton plant was designed under the supervision of Mr. Poynton and with the co-operation of Enterprises Industrielle Babbitless of France, which supplied the crushers and screens, and of the Barber-Greene Company, which supplied the belt conveyors.

Clearing of the property was begun in March, 1958, and construction of the plant started in April. Much cutting and filling was necessary due to the hillside location of the plant, but it went into limited operation in October. The weathered and broken stone encountered in opening the quarry had an excess of fines and was fed direct to what is now the secondary crusher. By the time the present primary crusher was ready in May, 1959, the quarry had been developed into the solid stone. Some screens were also added.

The deposit is in the Niagara series of sedimentary dolomites (Lockport) with beds varying from 9 in. thick near the surface to 4 ft. farther down. Under it is a deposit of hard shale with a good separation. The 2 to 4 ft. of overburden is removed by bulldozer and trucks. The quarry was opened at the top of the hill with a 40-ft. face, but this will become somewhat higher, as the surface terrain rises to the northwest away from the face. The quarry floor dips about 3 degrees to the west, which provides for future drainage.

Primary drilling in the quarry is being done with two Joy wagon-type Tracdrills, which have air motors and use 3-in. bits. Air is provided by two 650-c.f.m. stationary compressors. A 7- by 10-ft. hole pattern is used. Holes are loaded with Canadian Industries ammonium nitrate prills, except for 70 percent Cilgel, to above water level. A cap is used at the top of each hole, with Primacord down to the dynamite, so that in case of trouble the cap can be retrieved. Shots are usually 50 to 60 holes in two or three rows. Secondary breaking is done with a 2,000-lb. dropball from a crane boom.

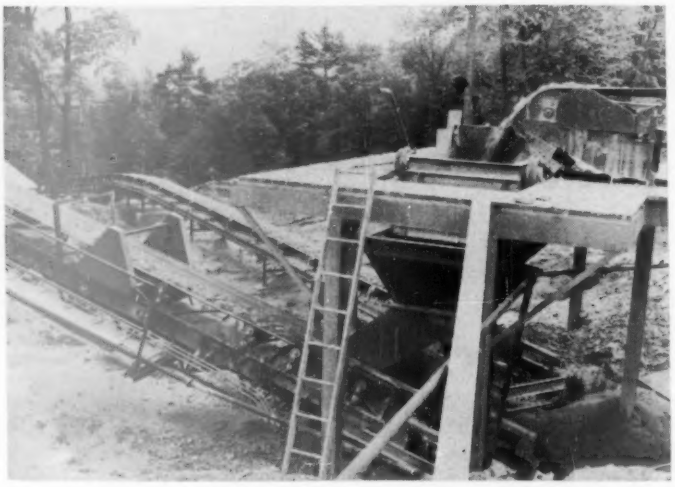
Euclid end-dump trucks (22-ton) are loaded by a 1½-cu. yd. Northwest diesel shovel and now haul about 200 ft. to the primary crusher.

The quarry rock is now discharged directly to a 5- by 15-ft. Stephens-Adamson Giant type feeder which can take up to 100 tons from the Euclids at one time. The feeder discharges this material to a 40- by 48-in. Rogers jaw crusher. The 8-in. material from the jaw crusher is transferred by a 30-in. by 60-ft. belt conveyor to a double-deck Dillon vibrating screen with 2½-in. openings on top and ¾-in. openings on the bottom. The 2-in. throughs go to the surge pile; the ¾-in. throughs go to the steel bin and are used as a road surfacing rock.

The retainings on the 2½-in. deck go to a split feed and are fed to a French gyratory No. 21 crusher and to a 4¼-ft. standard Symons cone. Those two secondary crushers manufacture 2-in. crusher-run material which also goes on a boom belt conveyor that discharges 375 t.p.h. to the surge pile. This pile, which can be built to a height of 90 ft. above the reclaiming tunnel, has a storage capacity of about 10,000 tons.

There are two Syntron 12-speed vibrating feeders under the pile but

The 1½-cu. yd. diesel shovel loading one of the 22-ton end-dump trucks in the quarry.



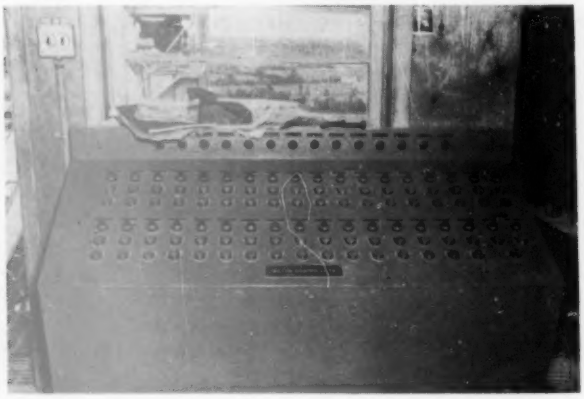
The reclaiming conveyor under the raw surge pile, with split feed to the crusher-run bin conveyor (right) and plant flow (left). Note the metal detector on this conveyor.

only one is used at a time to feed the 30-in. by 120-ft. horizontal reclaiming belt conveyor (No. 2) at any desired rate. This conveyor has a suspended magnet near its discharge end and discharges the 2-in. crusher-run rock through an adjustable splitter which can be set as desired. One side goes to 24-in. by 136-ft. belt conveyor (No. 4), which feeds to one of two 120-ton steel bins for truck loading of crusher-run rock.

The other split goes to 30-in. by 136-ft. inclined belt conveyor No. 3 to the No. 1 screen in the upper mill, a 5- by 12-ft. Babbitless 2-deck machine with 2- and 1-in. openings. The minus 1-in. throughs from this screen go to a steel bin from which a Syntron vibrating feeder and a 24-in. by 115-ft. belt conveyor (No. 5) feed to the second crusher-run bin.

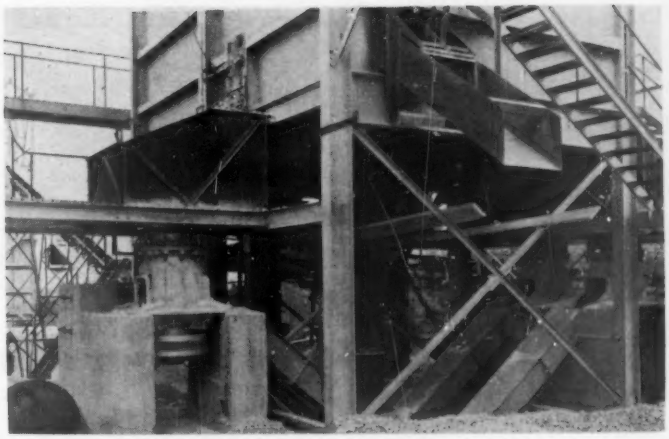
The oversize and the material off the bottom deck of this screen—2- to 2½-in. and 1- to 2-in.—are discharged into two 100-ton steel bins. Under these bins are three Babbitless No. 504 gyratory reduction crushers. These are non-clogging, and they can be started under load. They are fed through slide gates, two from the coarse bin and one from the other. The partition between the two bins is so arranged that when one is full, it will overflow into the other. Adjustments for various sizes can be made by changing the bottom deck of the screen and/or adjusting the crusher settings as desired. The crusher settings are not all the same, but this

This control board at the central tower is for all operations from raw surge pile reclaiming to product stockpiles and loading bins.



The 5- by 12-ft., two-deck French-made screen which scalps coarse rock to the tertiary gyratory crushers.

Two of the three French tertiary gyratory crushers which are non-clogging and can be started under load.



The three French reduction crushers discharging through chutes onto the conveyor to the final screening building.

combined product usually has a 1¼-in. maximum size.

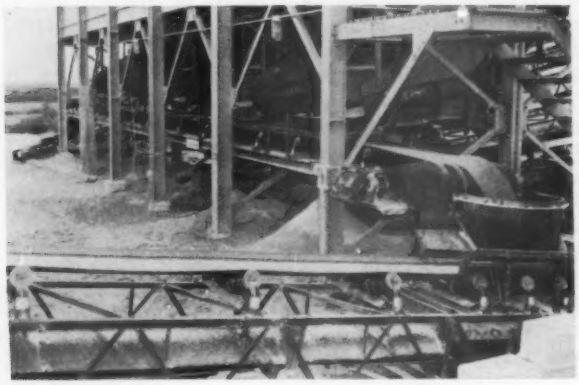
Products of all three crushers are discharged through chutes on 24-in. by 142-ft. inclined conveyor No. 7 to the top of the final screening building. There the minus 1¼-in. material is discharged to screen No. 2, a 5- by 12-ft. Babbitless 2-deck unit which usually has a $\frac{1}{16}$- and ⅝-in. wire cloth. The 1¼- to ¾-in. rock off the top deck goes to the first compartment, and the ¾- to ⅝-in. off the bottom deck to the second compartment of a steel bin with five 120-ton compartments.

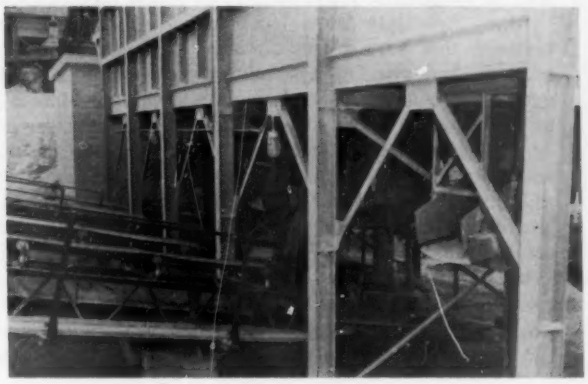
Minus ⅝-in. material through the bottom deck of this screen is carried on 24-in. by 20-ft. belt conveyor No. 7 to screen No. 2. This is another 5- by 12-ft. Babbitless

(*Continued on page* 236)

This view shows the conveyor from the surge pile to the scalping and tertiary crushing building and the final screening building (background). At the left is the radial stockpiling conveyor.

Left: Five variable-speed feeders under the final screening building discharge any size or blend to the reversible conveyor to the stockpiling conveyor at one end. At the opposite end this conveyor discharges to the conveyor to one of the five loading bins.
Below: Four of the five feeders on the opposite side of the bins discharge to individual conveyors to four other truck-loading bins.





Recycle Compensation

Basic Improvement for Closed Circuit Systems

THE many advantages of reducing particles in a system where the reduction machine is closed - circuited with a classifier have been known and capitalized on for many years. In the dry process minerals industries it has become almost standard practice to produce finished products which are controlled in top size as well as in particle size distribution. Thus, the use of a screen or an air classifier as a final sizer is normal procedure.

In the process of removing oversize material not sufficiently reduced by the crushing or grinding unit, it has also become established practice to return such material directly to the crusher or mill. While this is still considered the logical and accepted technique for closed-circuit systems, it is nevertheless a fact that it is also a haphazard and inefficient way to circuit the material.

Many operators know from experience that such closed-circuited crushing and grinding systems frequently become unbalanced, tending to drift toward overloading or underloading, although great care has been taken in supplying the system with modern volumetric or weight feed controls. It is the writer's belief that in the case of many external classifier systems the fault is not with the feeders but rather with the manner of returning the oversize recycle stream to the circuit.

Basic Analysis All types of crushing and grinding systems vary in their sensitivity to material feed loading. In this discussion we will be concerned with closed-circuit systems of the external classifier type since many of the internal classifier systems are kept balanced by sensitive instantaneous primary feed adjustments actuated from mill-air resistance measurements. They are thus provided with built-in compensating feed control. This cannot be claimed for systems with externally located screens and air separators.

Among size reduction units using externally located classifiers, two groups may be distinguished on the basis of particle residence time. Ball, tube, and rod mills fall into the long-retention-time class, whereas most other crushers and grinders provide short grinding periods at each pass.

These cylindrical mills have another distinguishing feature, compared to other types of mills, in that the ratio of total mass-momentum of mill and grinding media to the resistance-momentum of the material is much larger than in other crushers and grinders. Thus these mills are of low power-draw sensitivity in relation to the material throughput.

For this reason their power consumption rate variations cannot be used as a measurement for feed compensation control purposes. If overloading is to be measured, it cannot be done until the overload appears in the more power-sensitive mechanical or pneumatic conveying system receiving the mill discharge.

Although it is true that compensating primary feed control is attempted with these mills by the use of sound measurements, for instance, it is still a matter of correction after the deviation from the optimum, as is also amperage measurement of recycle conveyor, elevator, or fan motor. No matter how and when we measure, it is basically corrective control that is being exercised.

The success achieved in leveling out load fluctuations in a mill-classifier system is closely related to the length of time cycle within each system in which off-norm loading is detected and then corrected. To reduce these inevitable fluctuations to the minimum, the writer proposes to emphasize preventive control over corrective control.

Factors Causing Load Fluctuations Two obvious variables will start a closed-circuited crushing or grinding system to cycling with detrimental effects on capacity as well as on distribution and uniformity of particle size gradation of the product.

The first variable is that of the volume or weight of material throughput, and the second concerns itself with grindability. Either or both of these variations, no matter how slight, can quickly throw a closed circuit system out of balance. The reason for this is found in the cumulative effect of overload on system efficiency, which is lowered dur-

By WOLF G. BAUER
Consulting Engineer

ing overloads just when it is most needed to clear the system.

Feed particle-size changes in the supply material, or those due to bin segregation effects, moisture variations, or feeder fluctuations may start crowding of the mill. This condition usually results in lowering of the grinding rate due to cushioning effects, so that in a short time there is an increase in the flow of the reject stream from the classifier.

Now we come to the major fault in the design of most external classifier systems. By leading this oversize material directly back to the crushing or grinding mill as an additive to whatever primary feed rate happens to be established at the time, we lose mill throughput measurement and control. The recycled screen or classifier rejects become a variable and unknown quantity unless measured and compensated for. They can exert a predominant influence on overload-underload cycling in view of the fact that this stream may constitute anywhere from 10 percent to 1000 percent of the primary feed.

There are two solutions to the problem. Either the recycle oversize-stream is entirely removed from the circuit and milled later (or mixed in with the material entering the feed bin), or it is measured so that the primary mill feed can be manually or automatically adjusted to compensate for its flow variations. We will be concerned here with the latter techniques.

CYCLE-COMPENSATED PRIMARY FEED

The obvious solution to variable-flow recycling lies, first of all, in measurement of this flow. As pointed out previously, this is readily accomplished in air-swept-type grinding circuits provided with internal classifiers. In these the mill airflow resistance or pressure drop is closely related to the solids concentration or loading of that air; and it is therefore a relatively easy matter to control automatically the primary feed rate from these pressure variations.

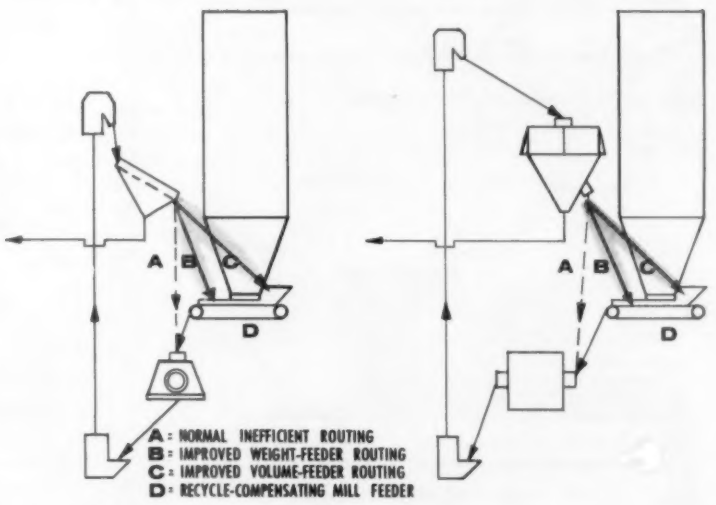
In some external classifier systems of either the screen or air separator types it has been possible to obtain a somewhat camouflaged measurement and feed-compensating control through the use of sensitive ammeters on the motors of conveyors or elevators supplying the screen or mechanical air separator. In these instances the primary feed stream is included in the recycle stream, and the combined flow is not an accurate or dependable measure for control purposes, especially when the ratio of recirculating rate to primary feed rate is low.

In the April, 1960, issue of PIT & QUARRY the writer discussed some of the possible arrangements and techniques for operating a recycle-compensated mill feeding system with two primary feed components in connection with pozzolan manufacturing control. With a single component feed, this compensating feature can be much simplified *for it remains only to lead the coarse rejects from screen or separator to the primary feeder in such a way as to cause that feeder to include the recycle stream in its volume or weight feeding function and operation.* No instruments, controllers, or separate feeder is required with the writer's technique for the above. See Figure 1.

Self-Compensating Weight-Feeder Design All weighing feeders can be made to compensate recycle stream variations. The actual technique or alteration and design change for accomplishing this requires a good understanding of how various feeders operate at the actual "cave-in" point of the material in the bin-feeder transition zone.

Most weight feeders operate on the principle of a scale-supported or pivoted belt through which an adjustable balance beam controls the depth of material by means of a pivoted gate; actuation is either

Figure 1—Closed-circuit recycle for efficient mill input control.



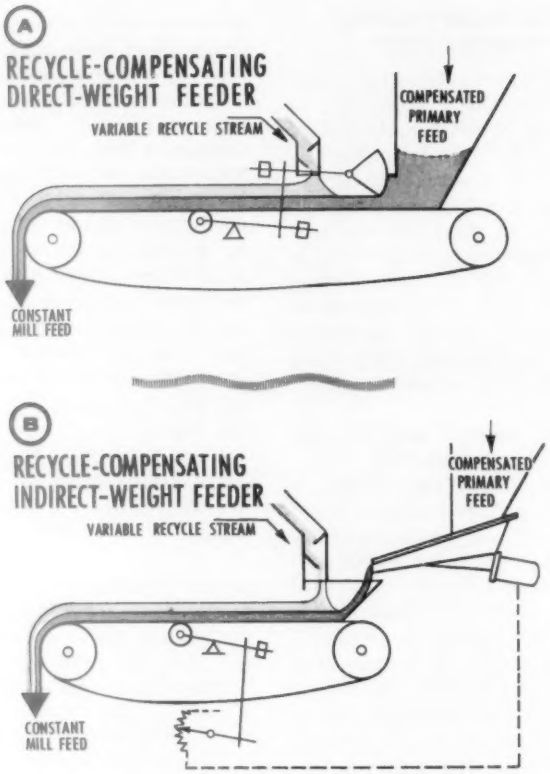


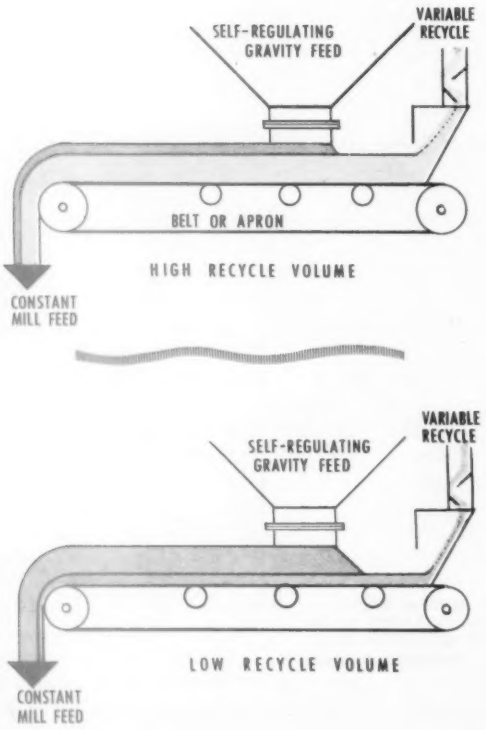
Figure 2

electric or direct mechanical linkage. Weighing feeders may also be of two-component design, in which a variable-speed volumetric feeder is controlled by the weighing belt onto which it discharges.

It is basic with weighing belts that the recycle stream be introduced onto the feeding conveyor *after the primary feed material* is deposited, so that the primary feed regulator continues to adjust only primary material upstream, and cannot slow down or stop the recycle flow. See Figure 2.

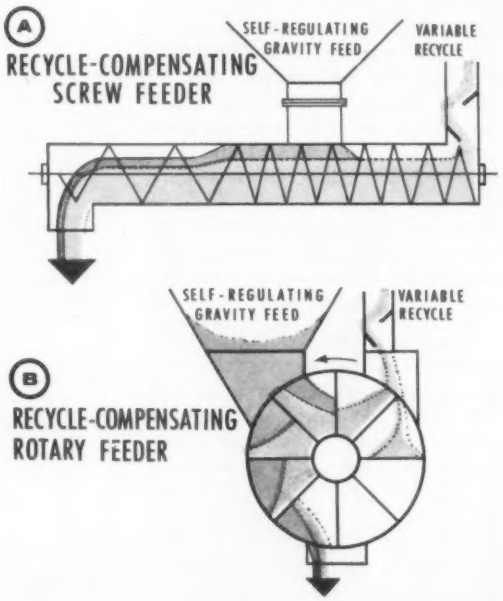
If the recycle stream is relatively small compared to the primary feed stream, it is possible to use the original primary weighing feeder to accommodate the extra load of the oversize material stream from the classifier. Minor alterations, such as increased feeder speed or higher skirt-boards, may suffice to convert the existing unit into a recycle-compensating weight feeder.

If the recirculation is comparatively heavy and large, however, a larger weighing unit or volumetric feeder is indicated. In that case it



Left: Figure 3—Recycle-compensating volumetric feeder.

Below: Figure 4—Adaptations of other volumetric feeders.



may be of considerable advantage to provide extra length and room between the operating gate and the scale pivot in order better to accommodate the recycle stream loading zone.

In a new installation it is best to have the feeder manufacturer take care of this at the time of specifying the unit.

Self-Compensating Volumetric Feeder Design In the case of volumetric feeding, the recycle stream is introduced to the feeder *ahead of or upstream from the primary feed material* entry point. The reason behind this lies in the fact that a volumetric feeder, whether it is belt, pan, shaker, vibratory, screw, or table type, feeds at a constant volume, and that the feed-conveying enclosure is always completely filled below the more or less fixed material-height gate or baffle.

It is therefore necessary to design the feeder volume large enough so that it cannot be completely filled by the maximum expected recycle rate at its low-speed setting. With proper engineering, particularly with respect to particle-size and material slide characteristics, each type of volumetric feeder will then become self-compensating as far as leveling out variations of screen or separator reject streams are concerned.

The illustrations in Figures 2, 3, and 4 are presented to show the reader the basic design points and principles as well as the differences in the application to be used with the direct and indirect types of weighing feeders and several volumetric types.

As mentioned earlier, the recycle stream can also be emptied into the top of the primary feed bin. This practice, however, has two drawbacks in that another conveyor or elevator would be rquired, and that the feed to the mill would not be as uniformly blended as with constant and instant direct recycle.

It is hoped that the analyses and discussions here presented will serve to stimulate engineers, feeder manufacturers, and plant operators in considering proper modifications, adaptations, and design of feeders and circuits for the improvement of this long accepted but fundamentally poorly conceived closed - circuit stream routing and feed control.

Many feeders could be manufactured in two styles, so that one design might be identified specifically as a "self-compensating" alternative type. In the meantime there are numerous crushing and grinding operations that could benefit by the simple alterations here suggested.

1959 Canadian Nonmetal Value Rose 16.5% to $176,230,000

Production of nonmetallics in Canada during 1959 increased 16.5 percent in value to $176,230,000 from $150,355,000 the previous year. Structural materials as a group climbed in value to $314,315,000 from $309,455,000 — increases in cement, lime, sand and gravel and clay products more than making up for a decrease in stone.

Cement valuation rose to $97,899,000 from $96,414,000; lime to $19,707,000 from $19,466,000; sand and gravel to $100,366,000 from $96,282,000. Stone fell to $51,167,000 from $55,583,000.

Value of minerals produced in Ontario in 1959 rose to $962,757,000 from $789,602,000 in the preceding year—accounting for 40.3 percent of the national total, against 37.5 percent in 1958. Output of Quebec (province) was valued at $432,830,000—18.1 percent of the all-Canada total, against $365,706,000 or 17.4 percent of the total.

Calaveras Transport Drivers Win Safe Driving Contest

Transport truck drivers of Calaveras Cement Company (division of Flintkote Company) have won first place in the miscellaneous fleet division of the American Trucking Association's 1959 national truck safety contest. A driving record of 1,453,195 miles without a traffic accident was the winning score.

A plaque commemorating the Calaveras safety achievement was accepted on the company's behalf by Joseph W. Kiley, personnel and safety director.

Products Plant in Baltimore Scheduled by U.S. Gypsum Co.

United States Gypsum Company will build a gypsum products plant at Baltimore, Md. Options have been taken to purchase a plant site on Marley Neck, adjacent to the U. S. Quarantine Station on Quarantine Road. Construction will start early in 1961, with completion scheduled for early 1962.

The Baltimore plant will be the company's seventh gypsum plant on the Eastern seaboard, and will serve the expanding Baltimore-Washington market area. Gypsum rock for the plant will be supplied from deposits in Nova Scotia by company-owned ships.

Meanwhile, the $6,000,000 mine and plant near Sperry, Iowa, is nearing completion. Mid-August is the expected date of initial production there.

The biennial symposium on drilling and blasting will be held at Golden, Colo., on the campus of the Colorado School of Mines on October 17, 18, and 19. Sessions will be sponsored by the mining departments of the University of Minnesota, Pennsylvania State University, and the Colorado School of Mines.

Western Gypsum Products Ltd. of Vancouver, B. C., has completed a $2,500,000 plant in that city for the production of plaster board. Annual capacity will be be 40,000,000 sq. ft. of plaster board and 15,000 tons of plaster annually.

Dates to remember: January 17-20, 1961, the annual convention of the National Crushed Stone Association, to be held at the Americana, Bal Harbour, Miami Beach; and January 23-26, 1961, the annual joint convention (no show) of the National Sand and Gravel Association and the National Ready Mixed Concrete Association, also to be held at the Americana.

Holloway Gypsum Grows with Area Agriculture

Mechanization, laboratory control give California plant its impetus

This view shows a truck-mounted drill that does exploratory work to determine new areas to be mined.

Below: A pan scraper, aided by a tractor-dozer, strips off layers of gypsum at 18 tons a pass. For processing, material is unloaded in windrows 11 ft. wide, 2 ft. high, and up to 600 ft. long.

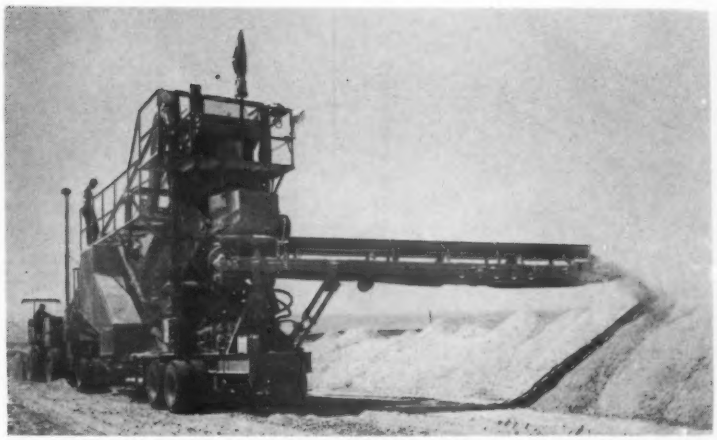
LIKE the many other agricultural gypsum producers in California's vast San Joaquin Valley, H.M. Holloway, Inc., enjoys the good fortune of being in the right place at the right time with the right product.

The right place is Kern County, the southern end of once semi-arid grass and sage brush land, which is now the nation's richest farm empire. The right time is—and has been for 20 years and more—a period of intense reclamation projects along the valley's entire western side. And the right product is, of course, calcium sulphate—so valuable as an alkali-neutralizing soil corrective.

Where Holloway differs from its competitors is in the aggressiveness with which its product is mined and marketed. This firm was the first in the area to adopt full mechanization, and the first to load out milled, ready-to-spread gypsum. And it still is probably the only California producer with complete laboratory facilities for controlling the quality of its product. Holloway's share of the state's consumption places it far out in front in its field. The remainder is split up among about two dozen other firms.

Diesels Weather the Dust

Holloway's activities are located on leased land near Lost Hills in a windblown desert area some 50 miles northwest of Bakersfield. Because of



These stockpiles, built by the mobile mill, are of ready-to-spread gypsum which is screened to soluble particles less than an inch in size. Holloway Gypsum maintains stocks of 60, 65 and 70 percent gypsum through a program of strict quality control.

Holloway maintains complete laboratory facilities for scientific processing control of all gypsum mined at its quarry.

the constant dust problem, 90 percent of the company's work fleet is diesel powered. Claude O. Knox, vice-president in charge of operations, says gasoline engines seldom lasted beyond 1,000 hours, but that the new diesel equipment is proving out well.

Included in the fleet are the following units: two D-7 Caterpillar tractors, two Be Ge 12-cu. yd. Carryall scrapers, three Michigan Model 210 motor scrapers (19-cu. yd.), one Michigan Model 380 tractor dozer, two Michigan Model 175-A tractor shovels (3-cu. yd.), two Pettibone Mulliken Model 56 Speedloaders, and one Adams motor grader 550.

A truck-mounted BHD Portadrill core-drilling machine from Winter-Weiss Company and a mobile gypsum processing plant round out the open-pit mining fleet.

First in the Field

The self-propelled mobile mill is a Holloway innovation. A 70-ft. giant that chews up gypsum at the rate of 300 t.p.h., it was custom-designed to Holloway specifications by Dr. Thomas B. Dorris of the Jacobs Engineering Company of Pasadena and Oakland, and was built in 1958 in the Carter Machine Shop in Wasco.

Harvey S. Holloway, president, says that in two years of operation of the mobile processing plant, which "takes the plant to the material," rather than hauling material to the plant, it has been possible to process up to 3,000 tons of gypsum a day.

"It's not important merely to mechanize, but to mechanize properly," Mr. Holloway explains. "Our mill is one example. Our sales went up immediately after we put it to work because the end-product was more efficient—reduced to readily soluble particles in the soil mass. Another example is the changeover we're making from crawler-type machines to rubber-tired units. Our three new rubber-tired earth movers are doing more than twice the work of the six crawlers they replaced."

Careful Preparation

The first step in the Holloway operations is exploration. Detailed mining and engineering plans of new areas are prepared by geologists. From these, Mr. Knox and his staff plot the pattern for the earth-movers to follow. In a typical 9-hour shift, two of the three Michigan scrapers move 2,500 tons of sand, silt, and clay overburden. The tractor-dozer push-loads each scraper in 40 to 75 seconds, depending upon soil conditions. The overburden weighs about 2,500 lb. per cu. yd.; and payloads therefore weigh out to roughly 18 tons each.

The overburden is dumped on wasteland or on areas already mined —a practice that eliminates double handling and keeps hauls under 1,000 ft. in length.

After the overburden has been removed, the same scrapers mine the gypsum, stockpiling it in windrows roughly 11 ft. wide, 2 ft. high, and up to 600 ft. long on previously prepared milling areas that are table-top smooth and clean. The processing plant then takes over.

Finished Product in a Hurry

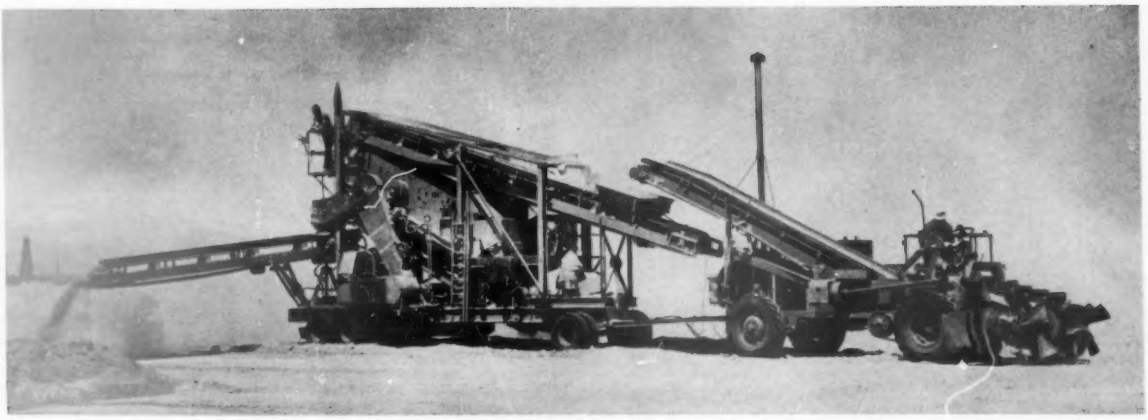
A two-man crew operates the processing assembly through windrows in the milling areas, scooping up the crude material and charging the mobile processor which screens the gypsum. A swivel conveyor spews the ready-to-spread gypsum into huge stockpiles for skip-loading.

In order to stockpile and control the quality of the three different grades of gypsum (60, 65, and 70 percent), skilled collaboration between the geologists, crew foremen, and lab technicians has long since been established.

Farmer customers for Holloway gypsum either send their own trucks to the mine for loading or arrange with the company for contract hauls. In either case, it takes the two Michigan tractor shovels less than four minutes to load a truck with 22 tons of material. Six passes do the job.

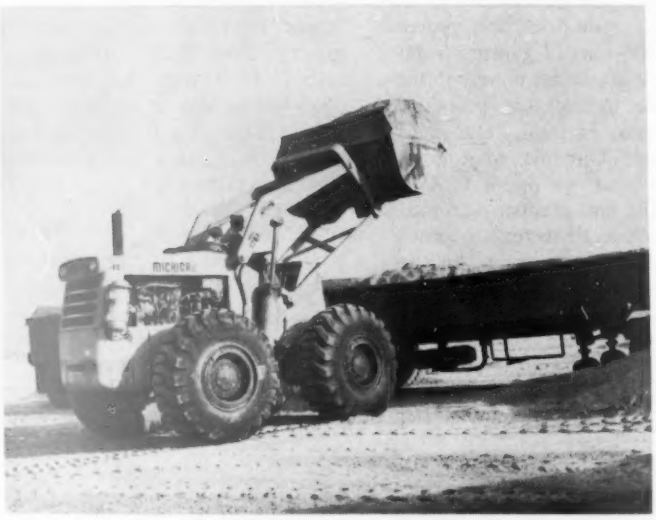
Three Decades of Progress

This highly mobile, highly mechanized operation contrasts sharply with the pick-and-shovel methods used by Harvey Holloway's father just 28 years ago. In the depression



Above: This gypsum processing mill (specially designed and built for Holloway) traverses the mine floor, scooping up crude windrowed gypsum. It crushes, screens, and stockpiles automatically at 300 t.p.h.

Below, left: The tractor shovel loads a farm-customer's trailer with 22 tons of ready-to-spread gypsum in 4 minutes.



Below: Harvey S. Holloway (left), president of the growing firm, and Claude O. Knox, vice-president in charge of operations, check a geologist's chart of new, unmined gypsum deposits.

year of 1932, H. M. Holloway was working as a watchman for an oil company near Lost Hills at $100 per month. In 40 earlier years he had accumulated considerable mining experience in various Western states. Consequently he took an interest in outcroppings of gypsum near the shack where he lived.

At that time California agriculture had not yet fully awakened to the value of calcium sulphate as a soil amendment. Nevertheless, there was a small but growing demand for the mineral which excited Mr. Holloway's imagination. Operating first with a pick and wheelbarrow and later with a borrowed tractor, he and his wife—with the help of a Wasco bank—kept the business alive practically alone for the first few years.

Wartime Boom

By 1937, the aging couple was able to secure larger leases, and the outbreak of the war in 1941—with its heavy demand for increased farm output—found them a thriving concern with six-full-time employees. Soon Mr. Knox, a son-in-law, and Harvey Holloway, an oil company executive from Long Beach, joined up, and the firm was incorporated in 1944. H. M. Holloway, Inc., now maintains headquarters at 714 Sixth Street, Wasco.

"Happily," says Harvey, "both my parents lived long enough to see their dream of success fully realized. My father passed away in 1947 and mother died four years later; but while both were still alive, Holloway's gypsum was being widely used as far north as Modesto."

They would be pleased to know that in 1960 a single day's output of Holloway's gypsum is about equal to all the calcium sulphate used in California farming during the first year that work was begun in the Lost Hills mine.

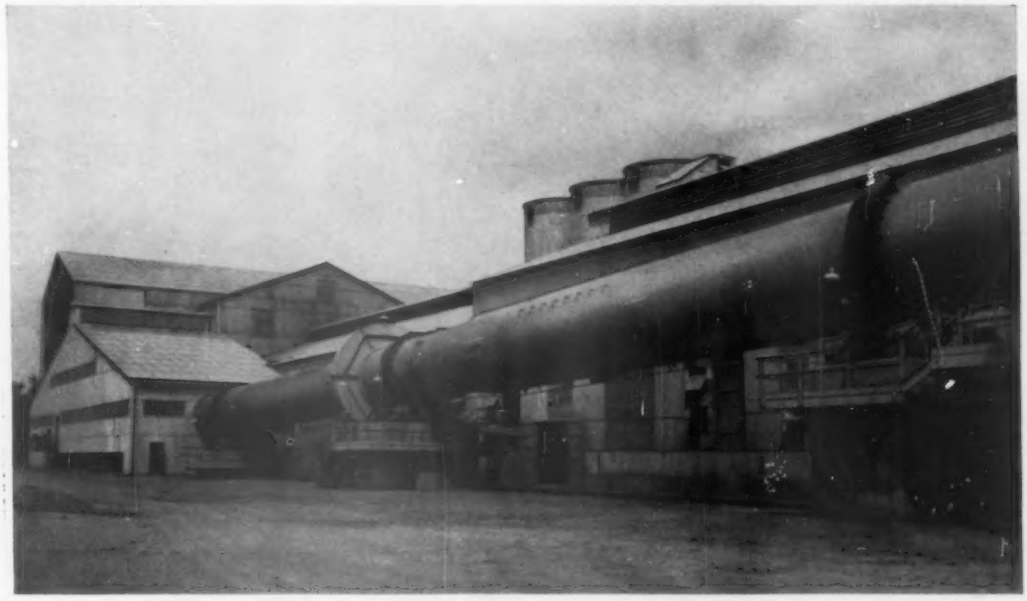
pit and quarry

THE BASIC MAGAZINE IN A BASIC INDUSTRY

july 1960

THIRTY-SECOND ANNUAL CEMENT MILLS SECTION

SMIDTH ROTARY KILNS



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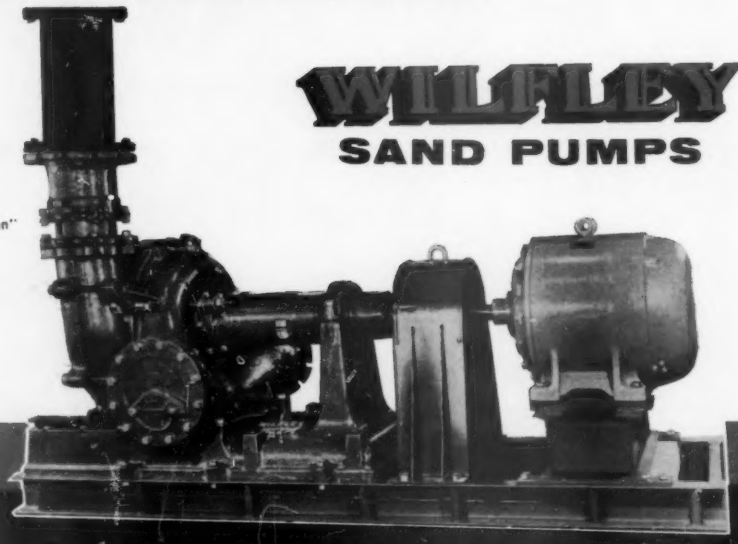

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5' x 8' special scalping screen with abrasion resistant liners—5" opening.

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OPEN OR DUST TIGHT
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3' x 6' dust tight cement scalper.

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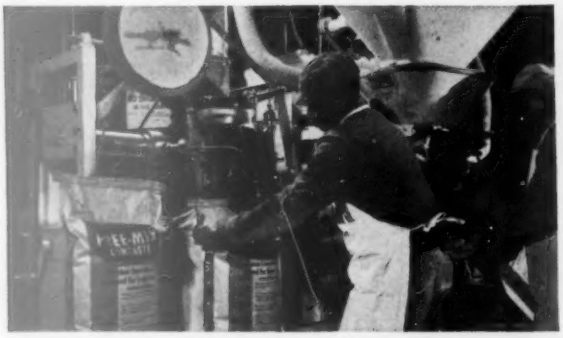
A case history of Bemis service that could mean a lot to you

Our principal business, of course, is to sell bags in any honorable way.

But we much prefer to sell them through service, such as we have had the opportunity to render over the years to General Material Company, St. Louis.

The General Material–Bemis case history, related chronologically here, shows some of the many ways in which Bemis is able and anxious to work with customers:

1952 General Material Company, a ready-mix business packaging its product under the trade name "Pree-Mix," is launched. A Bemis specialist advises the young company on bag construction and design, and assists in setting up a packing line.



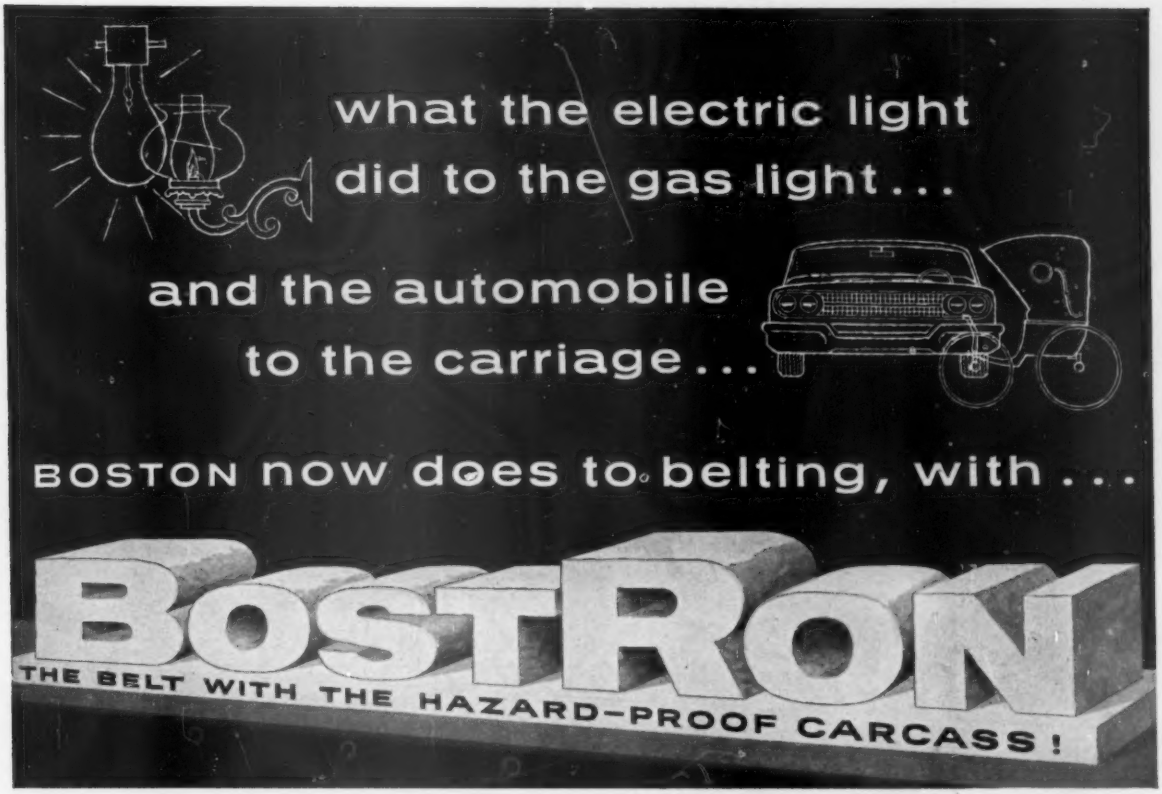
1956 General Material outgrows initial plant, constructs new plant with much greater capacity. To handle the increased output, Bemis Packaging Service representatives work with company officials and install complete Bemis packing line: Bemis Gravity Packer, Vee-Trof Conveyor and Bemis Sewing Machine Pedestal. Mr. Martin W. Melican, plant superintendent, states that "the use of the Bemis Gravity Packer has been instrumental in doubling the output of our products."

1960 Now an established company, General Material still receives close personal attention from Bemis multiwall specialist who keeps Mr. Melican and others informed of such new developments as Bemis Extensible Multiwalls. This close personal attention is typical of Bemis service.

This case history deals with one specialized phase of the rock products industry—but it indicates the wide range of facilities, technical skills, and packaging experience that Bemis makes available to all customers. If you would like to discuss your own packaging operation with a Bemis man, write today.

Where flexible packaging ideas are born

GENERAL OFFICES 408-Y PINE STREET, ST. LOUIS 2 • SALES OFFICES IN PRINCIPAL CITIES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did to the gas light...
and the automobile
to the carriage...
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THE BELT WITH THE HAZARD-PROOF CARCASS!

BOSTRON HAZARD-PROOF CARCASS MAKES ORDINARY BELTING OBSOLETE

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Exclusive new features in the latest model Raymond Mechanical Air Separator give the extra efficiency you need for meeting today's maximum cement specifications.

It does an excellent job in the non-metallics field for the uniform fine separation of cement, both raw mix and finished cement, as well as lime, gypsum and similar materials.

When operated in closed circuit with a grinding mill, it greatly increases output of the combined system.

- **The Whizzer principle gives sharper separation with higher recovery of fines, and also provides wide range classification to 99.9% minus 400-mesh materials.**
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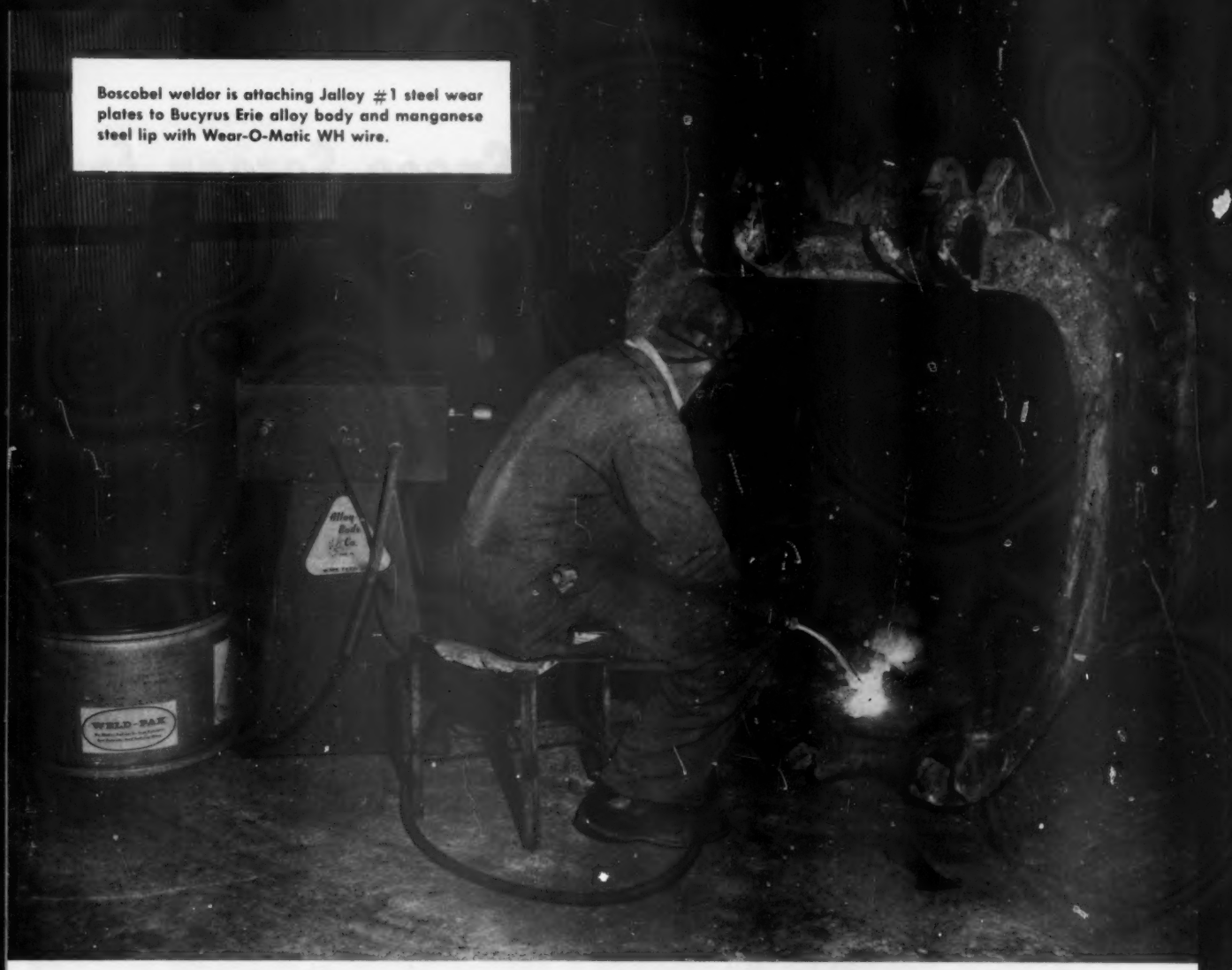

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35% Savings on bucket maintenance with NEW Wear-O-Matic WH welding wires

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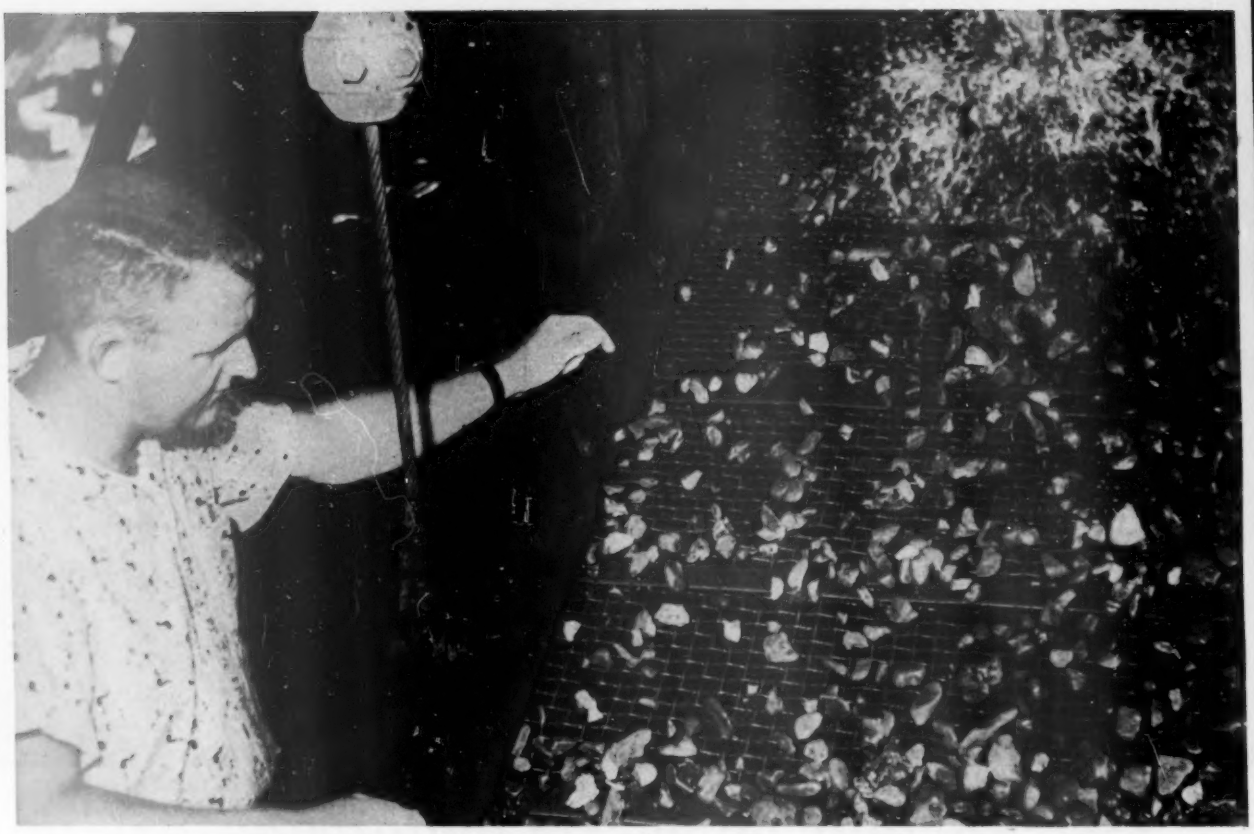
TWENTY YEARS OF LEADERSHIP IN THE DEVELOPMENT OF QUALITY ALLOY ARC WELDING ELECTRODES

There's a CF&I Space Screen for



Greenville Gravel Company reports...

"CF&I Super-Tempered Space Screens are extra tough, give 50% longer life"

"During the eight years we've used them, **CF&I Super-Tempered Space Screens have consistently delivered up to 50% longer service life than other screens we've tried,**" says Mr. W. E. McCourt, president of the Greenville Gravel Co., Greenville, Miss., operator of the largest sand and gravel plant anywhere on the Mississippi River.

"We handle more than 150 tons an hour of crushed gravel dredged from the river bed, averaging a high 2.68 on the hardness test scale. In addition, we have to contend with a 7-1 proportion of sand entering our screens. Because of this brutal punishment, we need the very toughest and most abrasive-resistant screens available. Only CF&I Screens really measure up to these requirements."

CF&I Super-Tempered Precision Space Screens are made from oil-tempered, high-carbon steel in a wide selection of dimensions, weaves and edges. For space screens that hold cost-per-ton to a minimum, CF&I is the buy. Mr. McCourt speaks with authority when he says, "We have every reason to believe, on the basis of our own experience, that CF&I Super-Tempered Space Screens make good sense for any efficiency-minded concern in this industry."

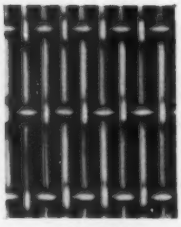
EVERY screening requirement

The experience of Greenville Gravel Co. is just one of many being repeated wherever screening operations are required. Whatever the conditions, CF&I offers space screens that will give the service you demand. This ability to satisfy your individual requirements is another of the meanings behind the Image of CF&I.

Super-Tempered wire is only one of the many types CF&I produces for weaving into space screens. CF&I also offers Wissco-Loy Precision Space Screens. Made from special alloy wire, these screens are designed and manufactured for lowest cost-per-ton screening. In addition, CF&I makes screens in carbon, alloy and stainless steels, manganese, aluminum, brass, copper, and Monel.

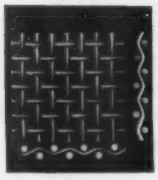
CF&I Screens are produced in a great variety of weaves, crimps and edge preparations. For long screening life, CF&I uses heavy wires, creating a relatively small open area. Screens for high-speed operation are made from thinner wire. Other screens are built to give a good balance between speed and long life. CF&I Space Screens are made from wire in diameters from .035" to 1", with openings from .063" to 6".

For complete information, get in touch with your local CF&I sales office, or write and ask for our folder on Super-Tempered and Wisscoloy Precision Space Screens (MS-675).

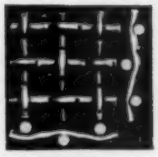


Rectangular Opening screens for maximum through capacity

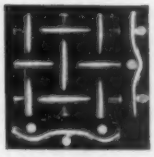
Long Slot screens for freedom from clogging



Double Crimp screens for long life under tough operating conditions



Lock Mesh screens for maximum accuracy



Flat Weave screens for minimum resistance to material flow

Hooking and Edge Preparations

Wrap-Around Hooked Edge (with or without) canvas, wire cloth or steel reinforcement)	Plain Hooked Edge (with steel wear strip)	Round Mild Steel Edge (wire woven in and welded)	Square Mild Steel Edge (bar welded on fabric)	Knuckled Edge	Turned Edge (plain hook)	Prefabricated Steel Angle (welded on fabric)

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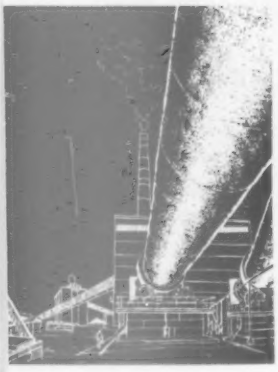
Dundee--BIG in Size



★ Largest new cement plant combines • compact layout • maximum efficiency and • complete control with record-sized equipment

By WALTER E. TRAUFFER

ANOTHER ON THE SPOT report

ON the basis of size alone, the new 6,000,000-bbl. $26,000,000 plant of the Dundee Cement Company near Dundee, Mich., is the plant of the year. Not only is this the largest plant ever built at one time, but the individual units involved—kilns, mills, etc.—are also of record size. It is notable for many other reasons, including its unique control system, which approaches complete automation, the compact centralized layout and straightforward flow, its sound general design, and attention to detail.

Designed for a capacity of 7,300 bbl. daily from each of its two kilns, this plant is actually capable of producing 8,300 bbl. per kiln with a fuel rate of 860,000 B.t.u.'s per bbl. The design is such that the capacity of this plant can be doubled without alteration of any of the present installations.

It was felt that the low investment cost for such a plant and the production cost would make it possible to ship over a larger area, thus justifying the size of the plant. Based on planned capacity of 6,000,000 bbl. annually, the investment amounted to $4.30 per bbl., considerably under the usual figures. Production costs are already said to be from 40 cents to $1 lower than for older operations.

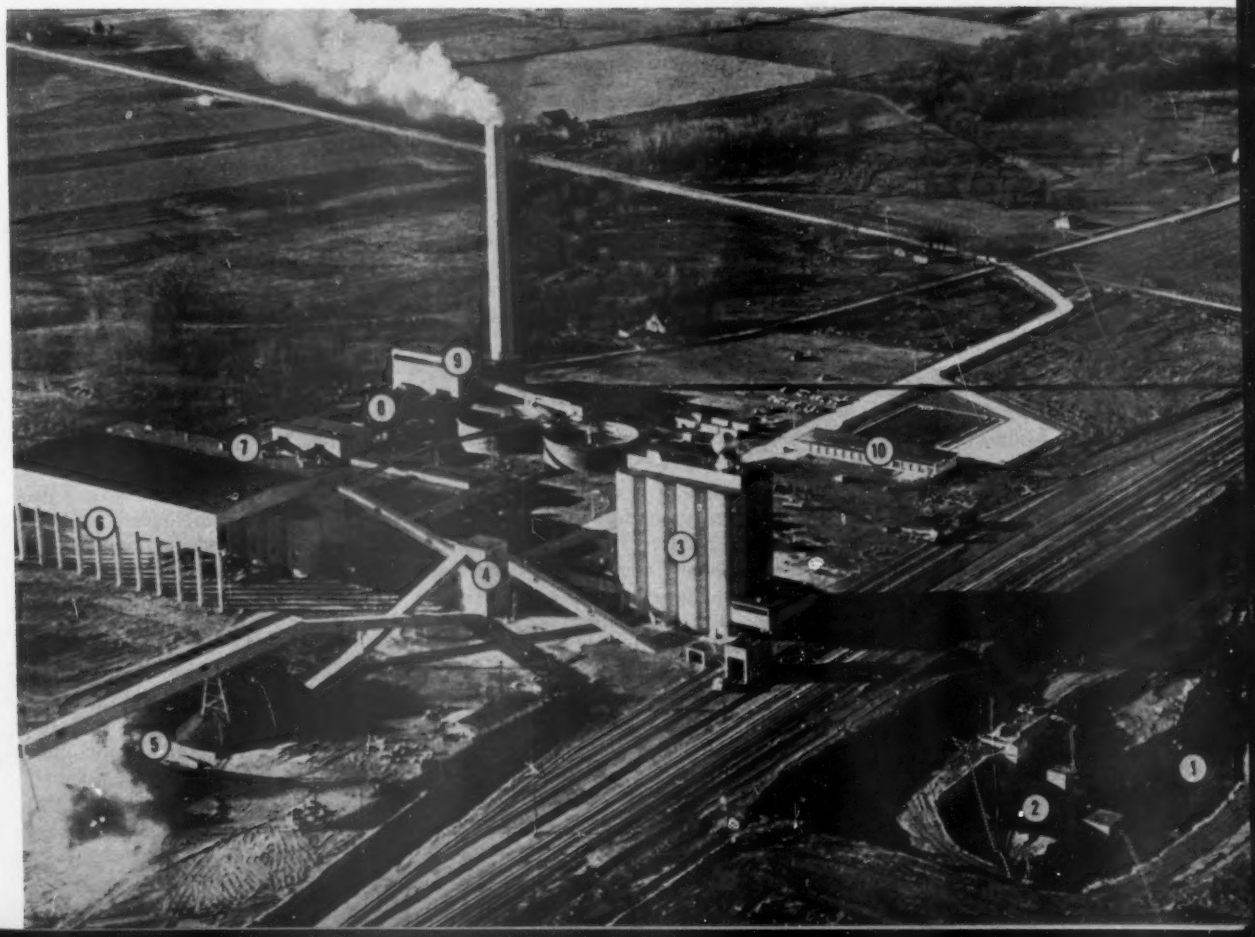
This outstanding operation is actually the fulfillment of an idea which had been developed by one man over a period of years. This man is Dr. Bernard Ulrich, executive vice-president and general manager of the St. Lawrence Cement Company. Dr. Ulrich had been associated with Holderbank's worldwide operations for many years when, in 1953, he was made project engineer for the new plant of the affiliated St. Lawrence Cement Company near Quebec City, the design

Left:
TOP MANAGEMENT: Dr. Hans A. Gygi (left), president of the new Dundee Cement Company, and Roblee B. Martin, vice-president and general manager, inspect the $26,000,000 plant just before formal dedication ceremonies on June 2, 1960.

Opposite page:
AERIAL VIEW of the 6,000,000-bbl. Dundee Cement Company plant, which is located on the outskirts of Dundee, Mich. The numbers in the photo are keyed as follows: (1) quarry containing clay and limestone deposits; (2) primary crusher; (3) cement storage silos with rail- and truck-loading stations; (4) conveyors and pipelines for raw materials and coal; (5) crushed limestone and coal storage area; (6) storage area for 200,000 tons of cement clinker; (7) main plant, housing the five grinding mills; (8) two 460-ft. kilns; (9) electrostatic precipitator area and 350-ft. stack; and (10) main office building.

and Concept

CONTROL PANEL IN THE MILL CONTROL ROOM. The mill operator handles the equipment which regulates the operation of the two raw and three finish mills, and also the reclaiming of raw materials from the stockpiles (coal and limestone).



of which he had supervised. In 1956 he also supervised the design and construction of the St. Lawrence plant at Clarkson, near Toronto, Ont.

During this period Dr. Ulrich began to design an ideal plant with extremely large individual production units to cut down labor and give centralized control and a high degree of automation. This idea met with company approval, and the basic plan was turned over to the St. Lawrence Engineering Department while a search was made for a suitable location for such a plant in this country. A site near the Great Lakes was preferred in order to provide a wider market, but no good deposit could be found in a suitable area. The present location was finally decided upon, with the plant at the deposit, rather than at the port of Monroe, 20 miles east on the shore of Lake Erie.

Construction of the plant was begun in June, 1958, and equipment was ordered in August and September of that year. Erection of the equipment started on May 1, 1959, when most of the concrete work, buildings, roads, etc., had been completed. Due to their size, the 100-ton kiln sections had to be brought by water to Monroe and then over a specially prepared route to the plant site. The first kiln went into operation on December 19, 1959, and the first cement was shipped on December 31, 1959. The entire project is an integrated design for operation, sales, and distribution.

The design, construction, and start up of the plant was under the direction of the engineering staff of the St. Lawrence Cement Co. The completed operation was turned over on March 1, 1960, on a turnkey arrangement, to the Dundee Cement Co. Like the St. Lawrence firm, Dundee is a subsidiary of Holderbank, but it is a U.S. corporation. Holderbank Financiere Glaris, S. A., holds an equity of the capital stock, but two-thirds of the total capital is U. S. owned.

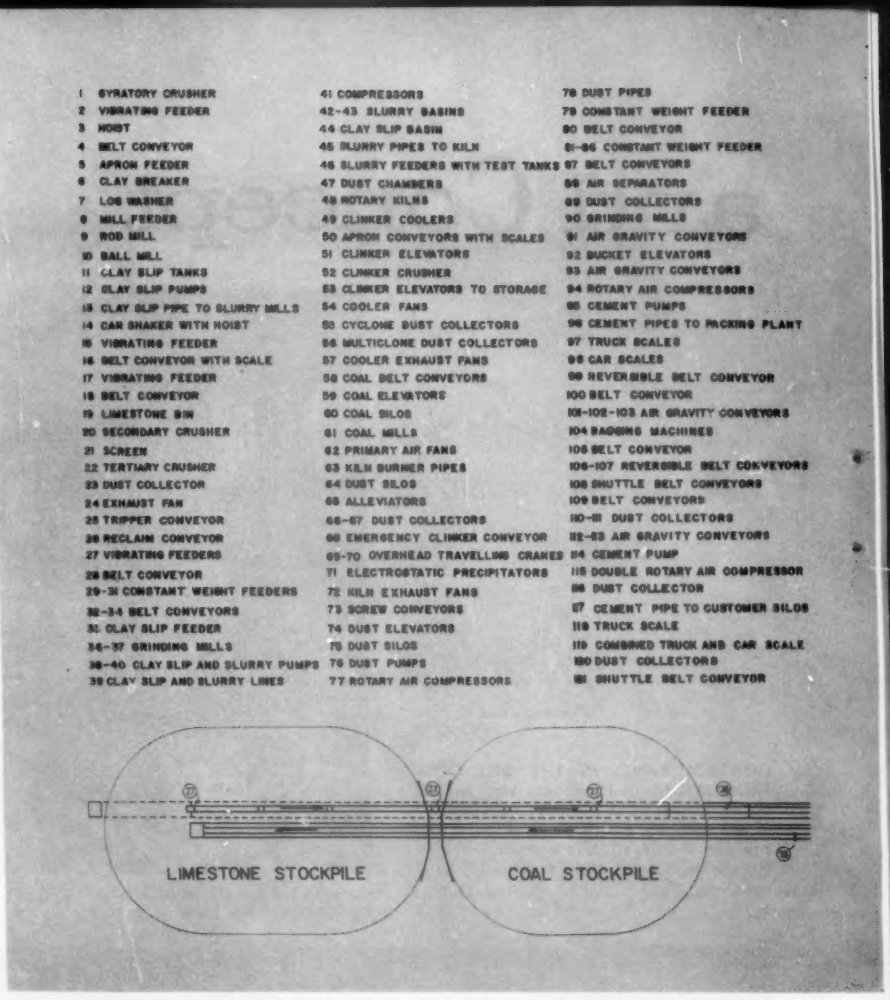
The plant is a compact and straightforward layout, with all major equipment under one roof. The main equipment is of the largest economical size, and there are large stockpiles or storage tanks between every important production phase. The plant covers a net area of only 60,000 sq. ft. and occupies a gross area of 30 acres. The horizontal traveling distance of the raw material from the primary crusher to the packing plant is only 4,000 ft. In order to inspect all vital machinery from crushing to packhouse, a supervisor would have to walk only 700 ft. The grinding mills in this plant are the largest in the world, and the kilns the largest in this hemisphere.

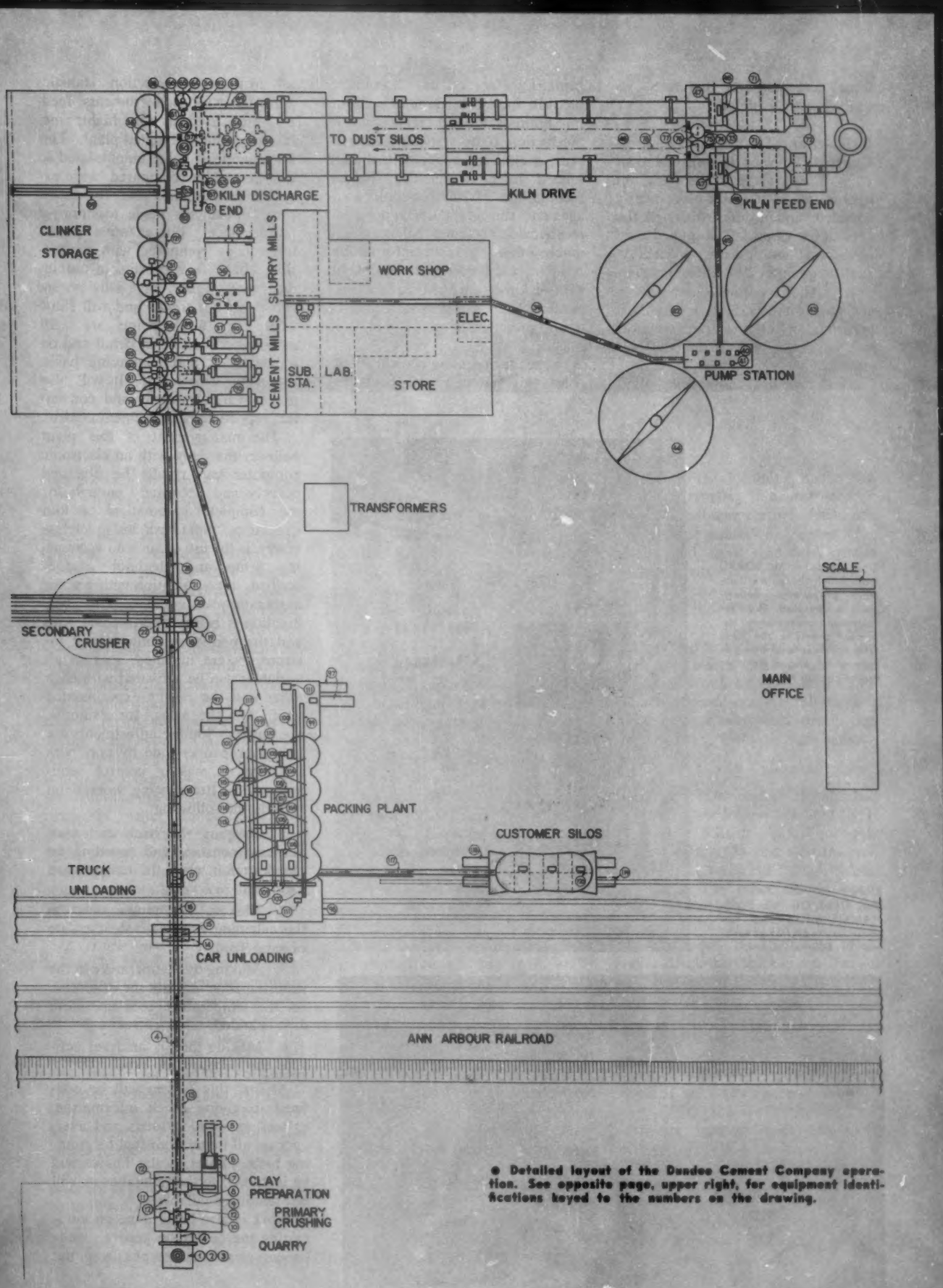
Heavy manual maintenance has been reduced to the minimum with overhead cranes in each department for handling heavy parts. Clearances in the buildings are generous throughout to permit the use of powered sweepers and transport and maintenance machinery. This plant will produce regular or air-entrained Types I, II, III, masonry, low-alkali, and other cements as required.

Dundee went to extremes to build a plant which would be attractive—an asset to the community and to its employees. Full advantage was taken of the architectural and other favorable features of concrete; all buildings were made functional without sacrificing appearance. Concrete pavement is used wherever there is traffic, and the entire property is being landscaped, sodded, and planted. Complete facilities are provided for the employees, including an attractive and economical cafeteria, and an air-conditioned office building.

FEATURES

This plant has so many unusual and interesting features that their description in the plant flow section of this article would greatly interfere with its continuity. Some of





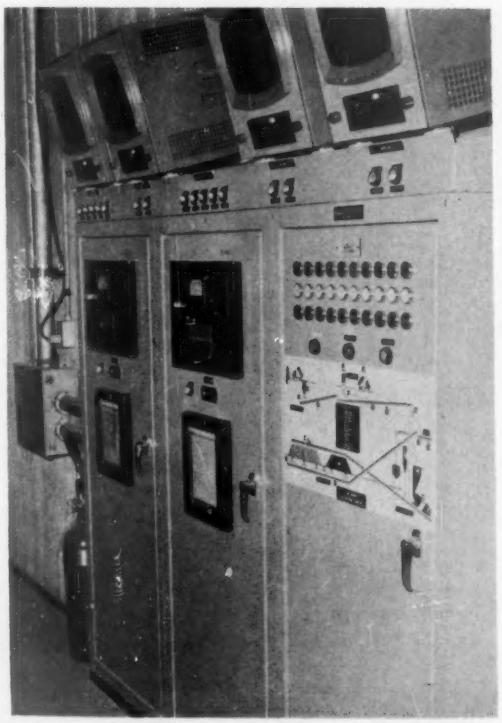
● Detailed layout of the Dundee Cement Company operation. See opposite page, upper right, for equipment identifications keyed to the numbers on the drawing.

these features are therefore described here in detail.

Calculator Control The system of controls used is well ahead of current practices; but it promises to be even more nearly complete and accurate through the application of an I.B.M. punch card accounting setup for production quality, quantity, and efficiency controls. This equipment includes a key punch and verifier, a tabulator, a sorter, an interpreter, a collator, and an electronic calculator, all electric.

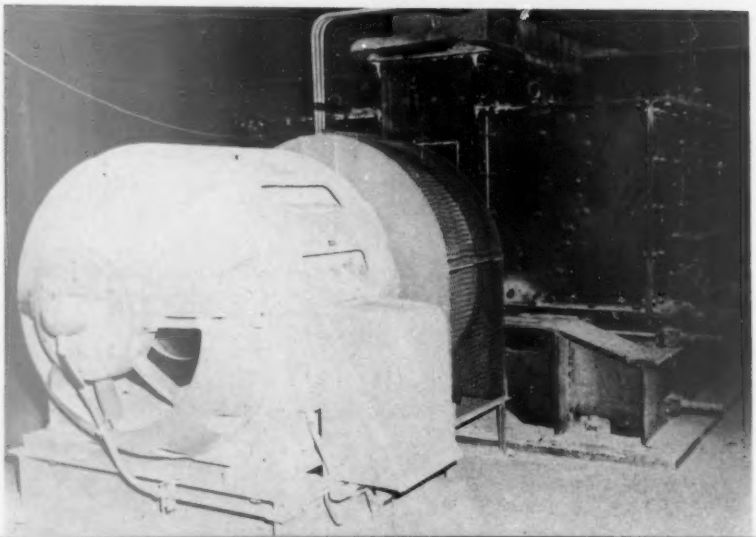
This system is now being used primarily for official accounting records, including revenue accounting, billing sales and credit controls, production costs statistics and records, maintenance cost distribution related to each machine, payroll records, etc. With this setup management can get daily reports on receivables, customer balances, and much other valuable information. A spare parts record is also kept, with a drop card for every part used to keep a constant record of stock and the necessity for purchasing.

From the operating control standpoint, this system is also being fed all available production statistics from the various instruments, feeders, etc., used in this highly mechanized and automated plant. This information is being manipulated so that it can be compared with expected performances and the necessary adjustments made to improve performance. For example, power use can be compared with production, coal use with clinker output, dust with clinker, etc. This system will point out trends and will show where any weak points are. All information will be in detail and on a controlled and continuing basis, rather than periodic. It will also make available timely and convenient reports for management control.



Right:
THE CONTROL BOARD from which the entire limestone preparation department is operated. The four television screens show important points in the flow. One operator and a helper (per shift) also make necessary control tests.

Below:
THE FIRST OF THE TWO HAMMERMILLS used for secondary reduction of rock, and its 800-hp. motor.



The management of this plant believes that only with an electronic computer can results be obtained quickly and accurately enough for the complete automation of kiln operation. Next best, and much less costly, is the use of such an accounting setup and calculator as described, in combination with a semi-automatic plant control. This combination is being experimented with and the necessary controls and instruments are installed, so that all variables can be activated with each other and the results experimented with. On the kilns, for example, the burner's routine adjustments are being taken over, one by one, with the aim of making control semi-automatic. Items being worked on include the following:

1. Keeping the back end temperature constant and speeding up the draft fan when the temperature rises, and *vice versa*.

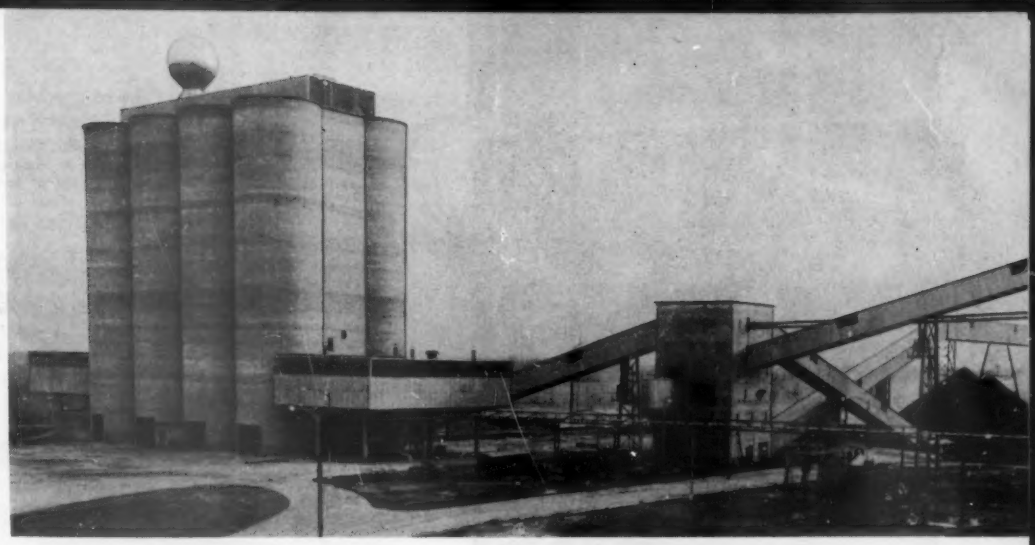
2. Making the temperature in the calcining zone activate the rate of coal feed.

3. Making the temperature in the sintering zone activate the dust feed. As the temperature goes up, more dust is added, and *vice versa*.

4. Making the O_2 analyzer activate the primary air flow.

At first this system will be confined to giving quick information, as well as running totals and averages on all items from fuel to grinding balls. Later, dollar figures will be included, so that actual costs will be readily available.

Work is also being done on automating the cooler on general, well-known principles, emphasizing the



THE SECONDARY CRUSHING BUILDING and the limestone and coal storage and reclaiming system are at the right. The main cement storage and packing installation is at the left.

constant temperature of the secondary air going into the kiln.

Production Control Production is totally controlled from four main control centers or panel rooms—clay preparation, limestone preparation, mill, and kiln.

1. *Clay Preparation Control*—One operator controls this installation, which, together with the primary crushers, is located in a building in the quarry. A TV screen shows him the dumping of the clay in the feed hopper. An electronic scale indicates the quantity of clay transported over the apron feeder; an Accuray density control indicates the water content pressure; gauges show proper function of the hydroclones; and power meters and recorders for the rest of the equipment eomplete the picture for the operator. The operator has one helper in this building.

2. *Limestone Preparation Control*—The entire limestone preparation department, from the primary crusher through the surge storage to the raw mill feed bins, is controlled from a central room in the secondary crusher building. This department has a flow diagram keyed to pushbuttons and lights, and also four television screens on which the operator can see important points in the flow. One TV camera is at the rock feeder above the primary crusher, one views the belt from this crusher, and one is in the reclaiming tunnel under the surge stockpile. The fourth screen shows the discharge from the belt feeding the limestone silos in the mill building.

3. *Mill Control*—The entire combined mill department, from the raw mill feed to the slurry blending, and from the clinker mill feed to discharge, is operated from a central control room with one operator and one helper per shift. The central control board includes an Industrial Nucleonics Corporation Accuray slurry density indicator with a Leeds Northrup recorder; a sonic slave recorder for loading control; and temperature and draft indicators, recorders, controls, etc. There are also two TV screens following the stone feed from the surge stockpile for the mill operator in reclaiming at night. The two men make their own titration, moisture, and fineness tests on slurry and fineness tests on cement, thus eliminating the usual laboratory mix control chemist. This system places full responsibility for quality as well as production on one man. Indirectly, better results are also obtained because a higher caliber of help is required for this very responsible job.

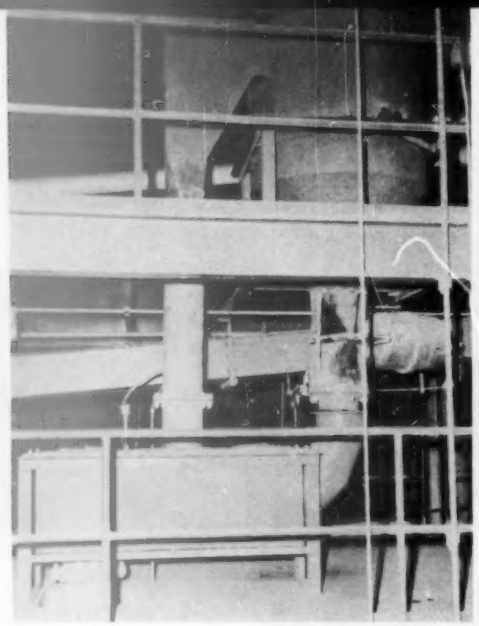
4. *Kiln Control*—The entire kiln department, from the kiln feed to clinker cooling, crushing, and storage, is operated from a central control room by one operator and one helper per shift. The very detailed duplicate control boards for each of the two kilns have all the usual instruments, including an L&N oxygen and combustibles recorder and analyzer, and temperature recorders for the front and back of the kiln and for three locations inside the kiln. A traveling indicator records the kiln shell temperature. There are also remote control instruments for slurry feed, draft recorders, power meters, revolution recorders, position indicators, etc., both for the kilns and the coolers.

These men make their own liter weight and coal fineness tests, and it is also planned to have them make gas analysis checks. As in the mill control, this places the full responsibility for quality and production on one man, with the same advantages.

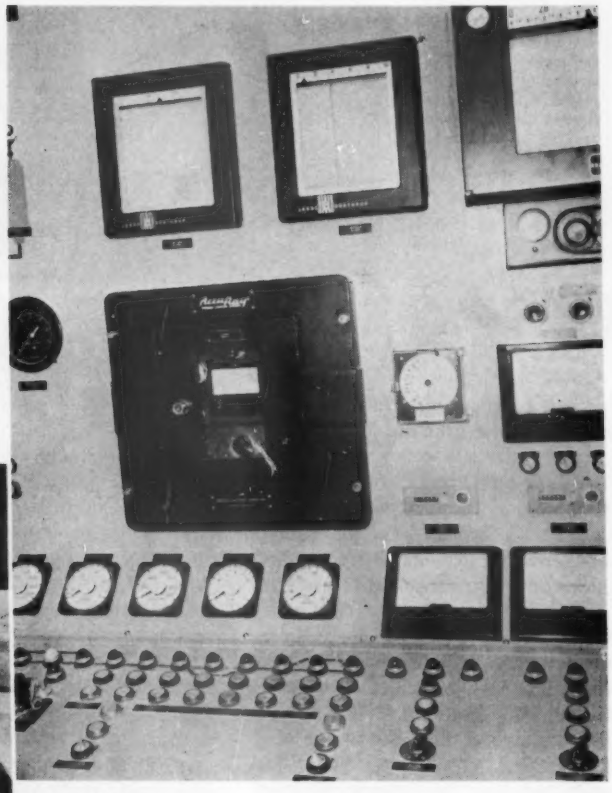
Clinker Storage The clinker storage hall is unique in that it is 150 ft. wide, but only 330 ft. long. On one side the mill feed silos act as a 60-ft. high retaining wall. The other side is open, so that clinker can flow freely out between the supporting columns, making it possible to store a 60-ft. layer of clinker throughout the entire crane area.

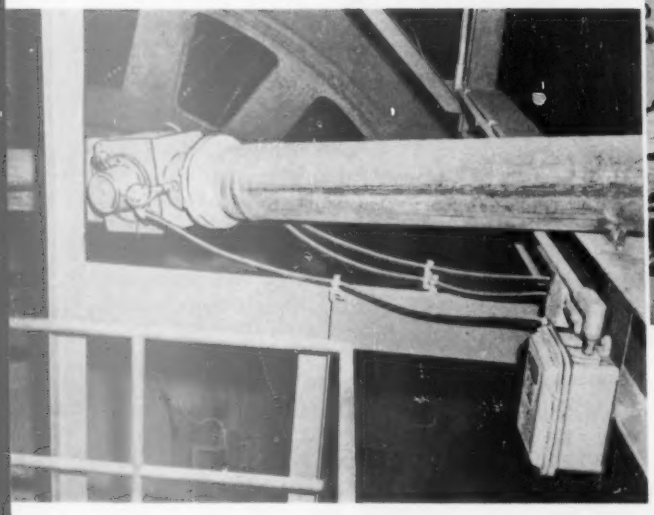
This open side also permits increasing the 200,000 ton storage capacity by bulldozing. The overhead crane is used only for spreading the clinker in storage. Actual feed of the clinker to the mill feeders is by gravity from the pile through openings under the silos.

Other Features Some of the other features of this plant, including several "firsts," are briefly described in the order of their occurrence, rather than according to their importance. *(Turn page)*



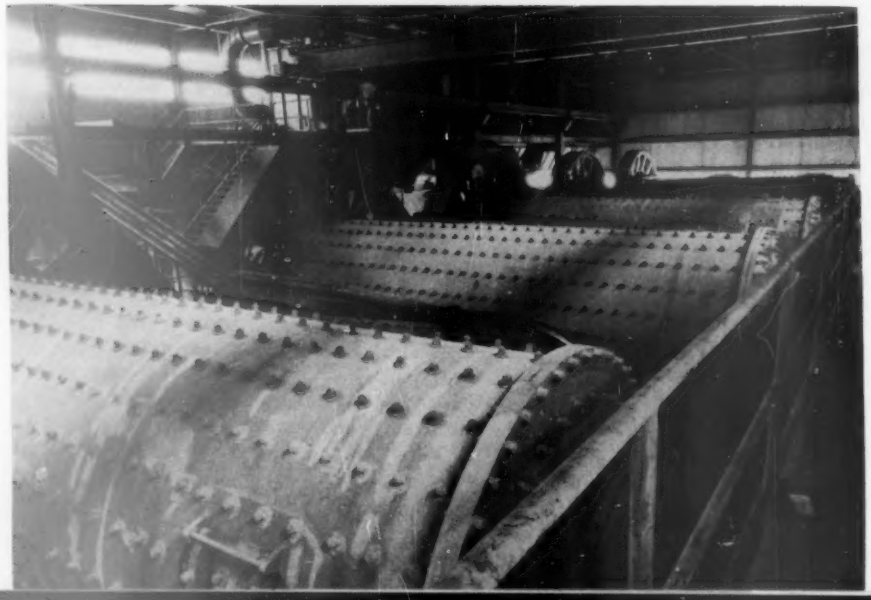
Top, left:
SLURRY FEED ARRANGEMENT for one of the kilns. Usual flow is through the pipe at the left, but the tank at the right is used for quick and automatic measuring of the rate of feed.





Above:
SLURRY DENSITY INDICATOR on the mill control board, with recorder above. Sonic slave recorder for the mill is above, right.

Left:
A MILL DISCHARGE LINE with slurry density indicating system.



Left:
THE MILL ROOM, with the crane serving the entire department. The two raw mills are in the foreground. The three finish mills and their dust collectors are in the background.

Clay preparation is accomplished by a special continuous process developed to fit the type of material available; it eliminates the cleanouts required by batch methods. The use of a rod mill is also unusual.

Secondary crushing of the stone is done in two stages in the same building, with gravity flow from crusher to screen to crusher. This system actually saved money by eliminating the usual conveyors and large building area required.

Use of the same conveying, surge storage, and reclaiming facilities for crushed stone, coal, and gypsum is an economy and a simplification.

Television cameras are used at five possible troublesome points in the raw material preparation departments, with screens in the central control rooms.

Two-stage raw material grinding is used with a two-compartment mill, followed by a one-compartment mill, both of the same size as the three finish mills. The minor disadvantages of this arrangement were felt to be outweighed by the simplified layout achieved with five identical mills. Accuray slurry density indicators on the raw mill discharge lines facilitate quick control of the slurry moisture content.

Two large slurry storage and mixing basins, each holding a three days' supply, eliminate the need for the usual correcting and blending tanks and their complicated systems of valves, pipes, and pumps. The unusually uniform raw materials help to make this possible.

Dust injection through the kiln burner pipes not only solves a disposal (or inter-mixing) problem; it also promotes efficient operation of the kiln at near-maximum capacity.

Dumbbell-type kilns, with enlarged sections at both ends, are preferred because with heat-exchanging chains at one end and clinker coating at the other, a uniform speed of air flow through the kiln is still possible.

F. L. S. spray cooling in the second compartment of the finish mills is the preferred method of solving the hot cement problem and it also insures maximum grinding efficiency and capacity and eliminates decomposition of gypsum.

The slurry and cement mills have automatic proportional feed control, actuated by sonic or electric ear installations at the first compartment.

KEY PERSONNEL in charge of Dundee operations (left to right): Werner Ostberg, plant manager; Roblee B. Martin, vice-president and general manager; Raymond S. Chase, sales manager; Boyd W. Yard, secretary-treasurer.

Twin separators on the finish grinding mills were necessary because a single separator of the necessary size was impracticable. The minor disadvantages of this arrangement are overshadowed by the definite advantages of the larger mills and the extra coating effect gained in the two separators. Feed to the two separators is automatically controlled, equally based on the power consumption of the two separators.

Bag packers located under the cement silos eliminate much of the usual cement conveying equipment and permit gravity feed to cars and trucks.

OPERATIONS

Deposit The Dundee limestone deposit has been known and on record for many years, but it had never been developed. It is the Dundee limestone of the Devonian age; but, unlike most occurrences, the top 40 ft. is low in magnesia. Deeper cores have shown an additional 20 ft. of high-magnesia limestone, below which is at least 100 ft. of dolomite.

Overburden averages about 40 ft. of clay which can be used for cement making. Both the clay and the limestone are very nearly uniform throughout the deposit, the latter varying less than 1 percent. An average analysis is as follows:

	Clay	Limestone
MgO	4 percent	1 percent
Fe_2O_3	4 "	
Al_2O_3	10 "	
CaO	13 "	54 "
SiO_2	48 "	
Ignition Loss	15 "	45 "

Quarry The quarry, just across the railroad tracks from the plant, is being developed parallel to the tracks. The top 12 ft. of the 40-ft. deep clay overburden is first removed and wasted. Then 20 ft. of clay is removed for use in the plant, and then the last 8 ft., containing large boulders, is wasted. Operations are so set up, however, that the boulders can be handled, should it ever be desired to work the clay deposit in two levels. The waste clay is hauled to a corner of the property where there is not enough stone to justify development. Later this clay will be dumped into the worked-out section of the quarry.

The entire quarry operation is on a development basis, and equipment is being rented temporarily while the best operating procedure is being determined. Six-in. blast holes are drilled with a Bucyrus-Erie 30 R drill. Loading of the clay and rock is done by three shovels—a Bucyrus-Erie 88B, a 3½-cu. yd. Lima, and a 2-cu. yd. Marion. Five 22-ton Euclid rear-dump trucks haul to the plant. *(Turn Page)*

Clay The clay used as the second raw material is, as stated before, a selected part of the overburden removed from the limestone deposit. It has a suitable analysis to blend well with the stone and is quite uniform through the property, but it is extremely sticky and difficult to process. A special method developed here, which is new to the cement industry, combines equipment usually found in the metal mining, sand-and-gravel, and industrial mineral industries. This department has been doing its job satisfactorily at its rated capacity of 400 t.p.h.

Quarry equipment is used to dig and transport all of the overburden. The trucks discharge the clay at the plant into an 80-in. by 34-ft. Chain Belt apron feeder. This unit discharges into a Hammermills, Inc., 48-in. Bulldog Non Clog hammermill driven by a 600-hp. motor. Water introduced into this machine helps to break down clay lumps and stones into a semi-slurry state, and also helps to keep the machine clean. This material goes by gravity to a specially-designed Eagle Iron Works quadruple log washer, where more water is added and about 60 percent of the slurrying is done. This washer is of heavy-duty design and has four logs 52 in. in diameter by 35 ft. long, with detachable paddles, driven by a 500-hp. motor.

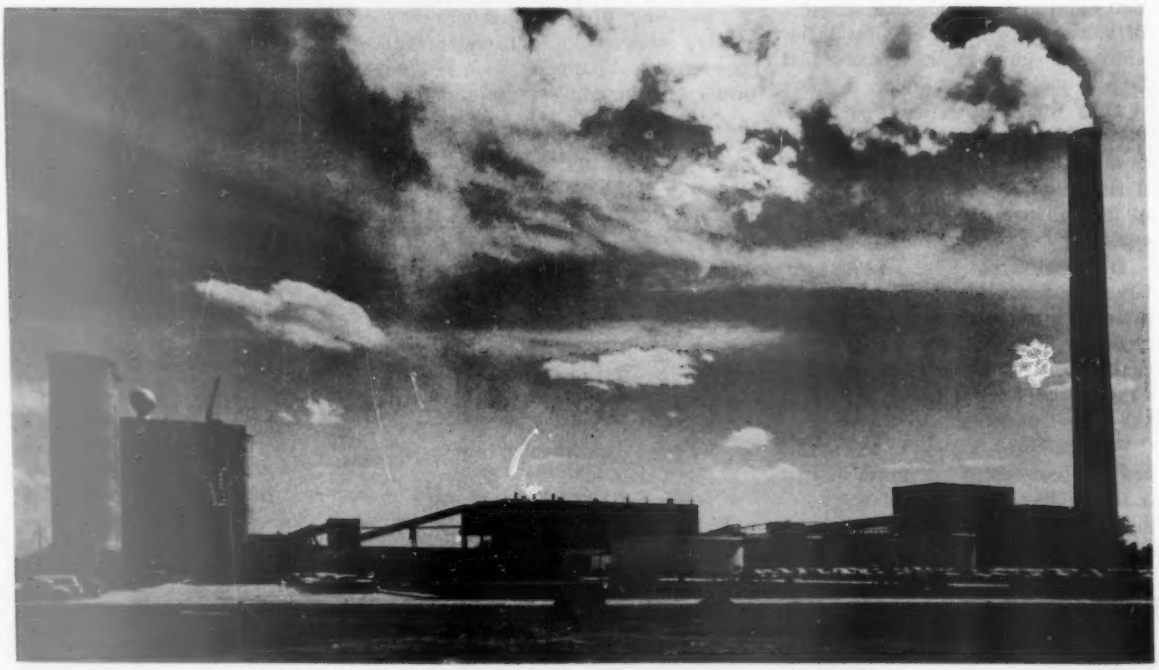
Coarse clay slip from the log washer goes to a special 30-in. diameter ribbon screw conveyor feeding the clay rod mill. This slurry still contains about 20 percent of clay lumps up to 3-in. diameter and about 20 percent of pebbles crushed to minus ½ in. The ribbon handles the coarse solids, and the slip and fines flow through the open center of the conveyor.

The 9- by 15-ft. Marcy rod mill is loaded with 55 tons of 2-, 2½-, 3-, and 3½-in. diameter rods and is driven at 16.5 r.p.m. by a 500-hp. motor. This slurry flows into a sump, from which it is pumped by two of four 8/6-in. Morris pumps into an overhead tank feeding a battery of five Dorr-Oliver 24-in. Hydroclones (one stand-by). The coarse material from these goes by gravity to a Marcy 10- by 10-ft. ball mill which is loaded with 53 tons of 1½-, 2-, 2½-, and 3-in. diameter balls and is driven by an 800-hp. motor. Its product flows into the same sump in a closed circuit and is pumped back to the Hydroclones. The Hydroclone product, minus 50-mesh slurry with 54 percent water, is pumped by one of two sets of two 8-in. Morris pumps to the 120-ft. diameter clay storage basin, which holds 7,700 tons (dry clay basis). This basin has a Dorr-Oliver mechanical and air agitator.

Crushing The blasted limestone from the quarry is dumped into the hopper of the 42-in. Traylor gyratory primary crusher at quarry level. This unit is driven by a 250-hp. motor and reduces to 5½ in. minus. A 10-ton overhead crane is used for maintenance and for stone handling. A 54- by 72-in. vibrating feeder discharges the rock on a 42-in. by 369-ft. inclined belt conveyor which passes underneath the railroad tracks. A second belt, 353 ft. long, elevates and conveys the rock to the secondary crusher building at the plant site.

In this compact installation, as has been pointed out, gravity feed is used with two crushers and a

THIS GENERAL VIEW of the plant was taken as construction of the new custom cement silos (left) was being completed. In the center is the main plant building; at the right, the precipitator building and stack; and in the foreground, the clay and slurry storage basins.



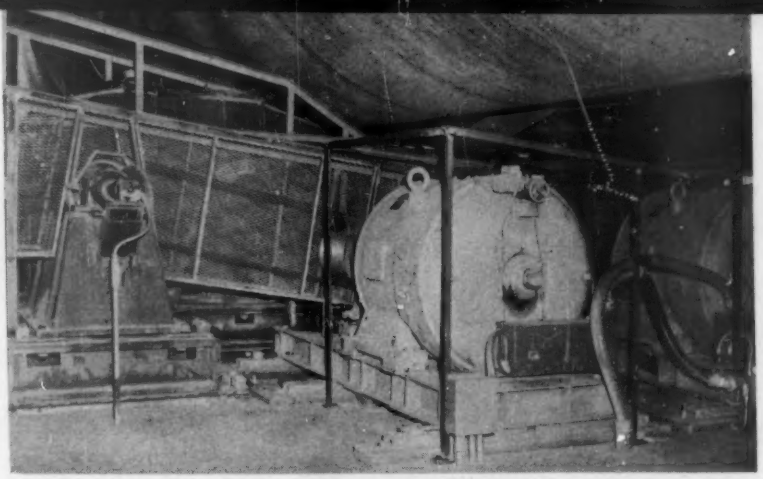
screen. The secondary crusher, at the top of the building, is a Hammermills, Inc., 24- by 70-in. hammermill driven by an 800-hp. motor. This unit has an open bottom, and the stone is split to a pair of 5- by 12-ft. Nordberg 1-deck screens with ½-in. openings. The oversize goes to a second hammermill which is identical, except that it has a ½-in. grate and is driven by a 400-hp. motor. The product of this crusher and the screen throughs, now 95 percent minus ½ in., are carried on a 42-in. by 649-ft. belt conveyor to a movable tripper conveyor over the open limestone, coal, and gypsum stockpiles.

The secondary crushing building is served by a 19,200 c.f.m. Norblo bag-type dust collector which, together with a Johnson-March spray system, applied throughout the crushing plant, helps to hold down dust.

The same flow is used for coal and gypsum, which are unloaded from hopper cars to track hoppers at plant level and fed directly on the second belt to the secondary crusher building. There the gypsum goes directly to the conveyors feeding the raw mill bins. The coal can follow the same flow, or it can bypass the crushers and screen and go directly to the belt conveyor to open storage.

Limestone and coal are reclaimed from the two stockpiles—42,000- and 18,000-ton capacity, respectively — by 60-in. Jeffrey vibrating feeders. Both follow the same flow *via* a 42-in. by 650-ft. tunnel reclaiming belt conveyor and a 369-ft. belt to a reversible shuttle belt conveyor over the mill feed silos. A Johnson-March spray system under the tunnel holds down dust in both the stone and coal. Along one side of the mill building are ten 400- to 800-ton silos, three for coal, one for future installation of slurry mills, two for additives, if and when used, two for limestone, one for gypsum, and one for special clinker.

Raw Mill The two raw mills and the three clinker-grinding mills, aligned in a single row in the mill building, are all identical in size, parts, motors, switches, etc. This was done for better operation, control, and servicing although it made necessary the use of the two slurry mills in series. This could be a disadvantage from the standpoint of power when only one of the two kilns is operated. An advantage is that there is only one control point for limestone and clay. One overhead crane serves all these mills and their related equipment and the burner platform.



EACH KILN is driven by two synchronized variable-speed a.c. motors through speed reducers.

Clay slip is pumped from the clay storage basin into a Kennedy-Van Saun overhead ferris wheel feeder and is fed in predetermined and interlocked proportions into the first slurry mill.

Limestone is drawn from either of two silos by a Jeffrey Waytrol weighing feeder on a movable carriage. The desired blend of 28 percent clay to 72 percent limestone, dry basis, and about 34 percent water is automatically maintained by an interlock, so that these proportions remain the same even if the feed rate is changed.

The two Nordberg slurry mills are 12-ft. by 36-ft. units. The preliminary mill has two compartments and contains about 200 tons of 3½- to 1½-in. steel grinding balls. The secondary mill has one compartment and is loaded with 200 tons of 1½- to 1-in. balls. Each is driven at 15.5 r.p.m. by a 2500-hp. General Electric 200 r.p.m. synchronous motor, and each is equipped with an inching device.

Slurry from the first mill is pumped to the second one. The finished slurry from the second mill has a fineness of less than 20 percent retained on 200-mesh and a moisture content of 34 percent. Quick control of the moisture content is made possible by an Accuray Industrial Nucleonics Corporation slurry density indicator on the mill discharge pipe. The 120-ft. diameter by 37-ft. basins have Dorr-Oliver mechanical and air agitators. No correcting tanks are needed as the size of these basins (each holding a 3-day supply) evens out any errors. As one basin is being used, the other is being filled, and the slurry is tested and clinkerized at three levels so that the product is known. Three feet of space is always left at the top of a basin so that corrections can be made, if necessary, by recirculating by pump from the bottom of the basin.

The corrected slurry is pumped from the basin to the Smidth double ferris wheel kiln feeders, which are synchronized with the kiln drive motors. Each of these feeders discharges into a measuring bucket which is kept full and which overflows to the kiln feed spout.

The rate of slurry feed to either kiln can be quickly and automatically determined at any time by these measuring "buckets." When it is desired to check the rate of feed, the operator in the control room activates a pneumatic pinch valve which opens to empty the bucket and then closes. When the slurry reaches a lower level indicator, this starts a timer which shuts off when an upper level indicator is reached. This device accurately

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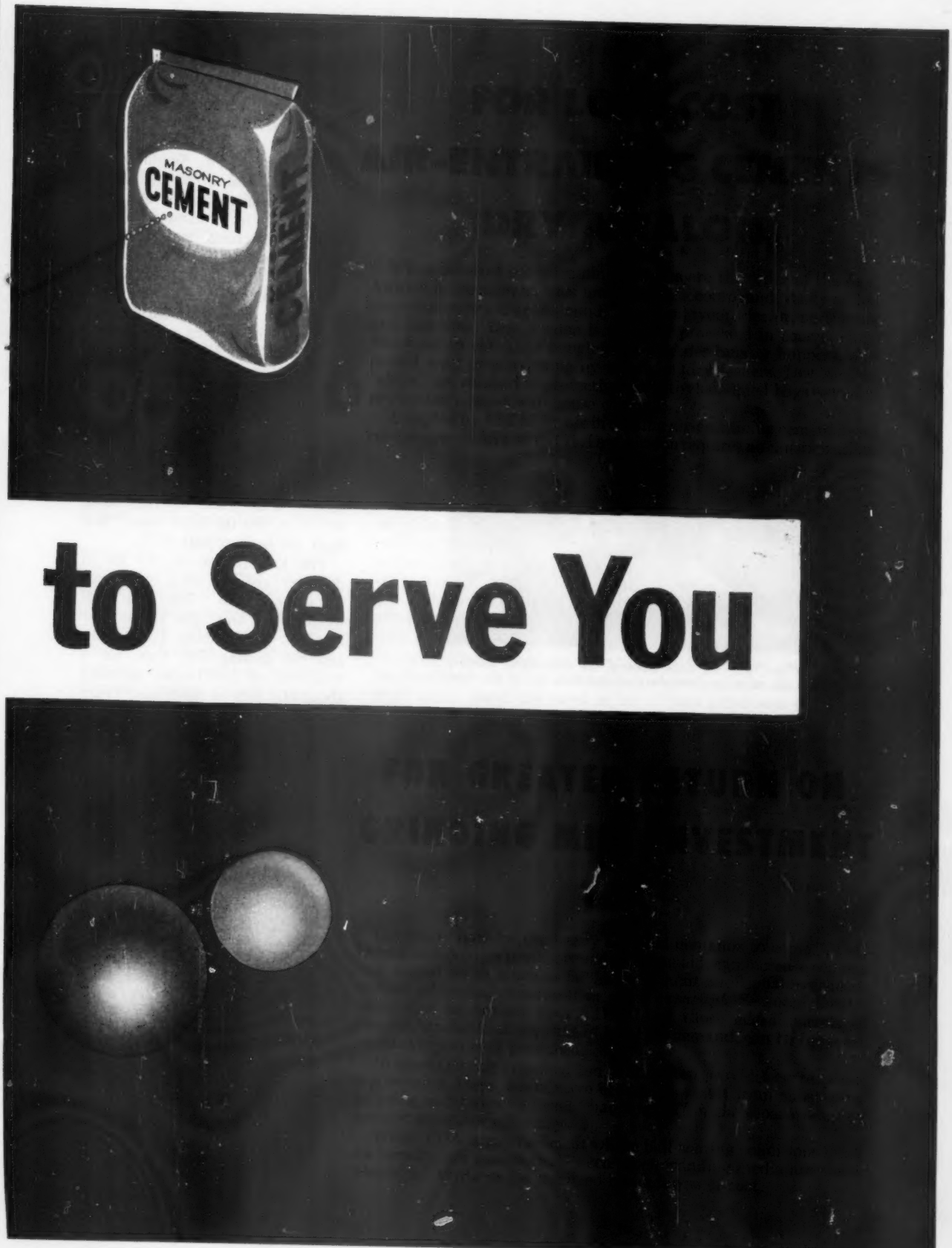
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THIS VIEW shows the kilns, with the drive building, the precipitator building, and the stack. Two of the three clay and slurry storage tanks are at the right.

measures the rate of feed in less than a minute and is accurate with a constant water ratio. The bucket never cakes up as it is always full of slurry in circulation and it is therefore always accurate.

Kiln The two F. L. Smidth rotary kilns, said to be the largest on this continent, are the dumbbell type, 16 ft. 6 in. in diameter for 111 ft. at the discharge end, 15 ft. in diameter for 178 ft. at the middle, and 16 ft. for 171 ft. at feed end. This design, which is gaining back some of its earlier popularity, provides an almost even speed of air flow through the kiln in spite of the chains at one end and the clinker rings at the other.

These kilns are pre-dimensioned to have less than ½ in. ovalization at any point. No stiffener rings are used, the stiffening all being done at the six riding rings. There the shell is 4 in. thick, tapering down to 1½ in. for the main shell. Seal rings are used at both ends.

The kiln rollers are 82 in. in diameter and the shell is inclined ½ in. per foot. The kiln shell weighs 800 tons, the chains 141 tons, the brick lining 1,100 tons, and the coating 200 tons, for a total load of 2,850 tons, including about 600 tons of materials. There

TWIN CONTROL BOARDS for the two kilns and their related equipment are attended by one operator and a helper per shift. Each has all the usual instruments, including oxygen and combustibles recorder and analyzer, temperature and draft recorders, indicators, meters, etc. Control tests made here give the operator full responsibility for quality and production.

have been no unusual problems, with the lining or otherwise, due to the extra large diameter of these kilns.

The heat exchanger chains are the Holderbank system, with the chains fastened in spirals, rather than from cylindrical rings.

Because of the large diameter of the kilns, lining them presented some interesting problems, and special installation methods were developed.* Five grades of kiln liners and three types of castable and mortar were used, all provided by the A. P. Green Co.

Each kiln is driven by two synchronized 250-hp. Brown Boveri variable speed a.c. motors. These are connected through V-belts to Jones speed reducers driving the helical kiln gears. The kiln speed range is from 24 to 72 r.p.h.; at present they are operated at 60 r.p.h.

Gases Flue gases from combustion leave the kilns at a temperature of about 500 deg. F. They pass through dust chambers into the two Buell Type SF 240,000 c.f.m., 3-compartment electrostatic precipitators. These units have all the latest features, including electro-mechanical rapping, automatic transistor voltage controls, and an improved type of silicon rectifier. They are designed so that half of either can be shut off for repairs, inspection, etc. The kiln exhaust fans are American Standard Sirocco units driven by 250-hp. Brown Boveri variable-speed a.c. motors. The Rust Engineering concrete stack is 30 ft. in outside diameter and 350 ft. high. It has an independent brick lining with enough space for inspection.

Dust from the smoke chambers and precipitators is fed by screw conveyors and bucket elevators to screens over 240-ton bins. Fuller-Kinyon 6-in. pumps transfer the dust to corresponding bins at the burner floor. Each of the latter bins is connected through an alleviator to a 3,000 c.f.m. Norblo dust collector. Speed-regulated dual screw feeders under each dust bin inject the dust at a uniform rate into the burner pipe. A 2-way valve in the dust return lines make it possible to feed dust from either line to either kiln, or from both lines to one kiln. This is an important feature under unstable operating conditions.

Coal The coal used is 14,200 B.t.u. per lb. high-volatile bituminous. Its receipt and handling has been described. From the belt conveyor system it is discharged into three 400-ton storage silos in the kiln feed building. Under each is a Jeffrey vibrating feeder, the one on each end feeding to feed conveyors, and the one for the center silo to the main coal belt. This belt is equipped with a suspended magnet to eliminate iron parts from the coal.

Coal is discharged from this conveyor through a motorized selector gate to bucket elevators feeding the 160-ton coal mill feed silos. From these silos Merrick feeders discharge through variable-speed air locks to the Raymond No. 633 direct-firing bowl mills. These are rated at 15 t.p.h., each grinding to 80 percent minus 200-mesh. The coal transport equipment is connected to a 6,000 c.f.m. Norblo bag-type dust collector.

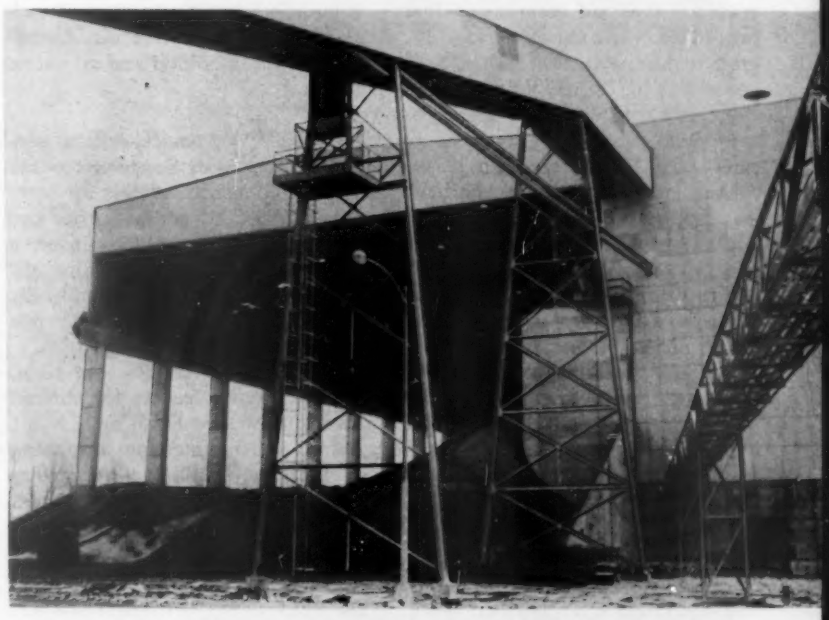
Drying air for the coal mills is drawn from the kiln hoods or from the coolers and through 18,000 c.f.m. Combustion Engineering cyclone dust collectors. Dampers automatically temper the air to 200 deg. F.

Primary air fans, driven by 200-hp. Brown Boveri variable-speed a.c. motors, and each with its own cooling fan, feed the pulverized coal to the kiln burner pipes. These pipes have motor-operated rotation, operable from the kiln control room.

Kiln Control In the operation of the kilns it is aimed primarily to hold the secondary air temperature from the coolers constant at 1,000 deg., and the dust chamber temperature between 400 to 500 deg. Primary air temperature from the coal mill is 200 deg. With these temperatures constant, the burning zone, measured by Rayotube, will be 2600 deg., the calcining zone 2,000 deg., and the section after the chain system 1500 deg. Oxygen is held at 0.5 to 1.0.

With these controls, the maximum production from one kiln to date has been 1,650 tons (8,300 bbl.) in 24 hours, compared to its 1,370-ton

*See PIT AND QUARRY, April, 1960, pp. 114-117.



Right:
THE CLINKER STORAGE BUILDING (200,000-ton capacity) with mill feed silos at the right. Normally, clinker flows by gravity from the piles through openings between the silos to the mill feeders, eliminating rehandling.

THE INTERNAL-SPRAY-COOLING installation on one of the three finish mills. This insures against dehydration of the gypsum, which might result in false set, etc.

(7,300-bbl.) rated capacity. This maximum may become the usual output as the maximum capacity on a kiln with dust return is regarded as the most efficient capacity.

Fuel rates are satisfactory, indicated to be below 2,300 B.t.u. per pound of clinker (860,000 B.t.u. per bbl.).

Clinker Clinker is discharged from each kiln to a 10- by 60-ft. Fuller horizontal, air-quenching cooler of standard design, with four pressure compartments below the grate and 70,000 c.f.m. fans. Each cooler has an 80,000 c.f.m. Multiclone exhaust collector. Each has two hammermills at the discharge end which crush the plus 2-in. clinker and throw the pieces back into the cooling zone.

Cooled clinker is discharged from either of the coolers to either of two 36-in. apron conveyors, each of which has a Trans-weigh clinker weight meter. Bucket elevators feed the clinker to a hopper over a 36-in. Hammermills Wobbler feeder.

Plus ½-in. oversize goes to an 18- by 60-in. Hammermills clinker crusher which feeds back to one of the elevators. This equipment is connected to a 16,000 c.f.m. Norblo bag-type dust collector. Minus ½-in. clinker is carried by one of two other elevators to a compartment in the clinker storage hall. There is also an emergency discharge *via* a 24-in. belt conveyor to the outside of the building, in case of a crane breakdown.

This building is 150 ft. wide by 330 ft. long and has a capacity of 200,000 tons of clinker under roof. The 150-ft. span Milwaukee overhead crane, with a 6-cu. yd. clamshell bucket, is used only for spreading the clinker in storage. This crane has a traveling speed of up to 500 f.p.m. It has a Westinghouse Load-O-Matic React-o-verse a.c. control for smooth operation and no excess power peaks.

Finish Mills The ten conical-bottom concrete silos alongside the mill room are used only for limestone, coal, and additives, but two are available for special clinker, if desired. In ordinary practice the Type I clinker flows directly by gravity from the 60-ft. high pile through the wall under the silos.

There are three 30- by 42-in. Jeffrey Waytrol feeders for clinker. Two of these, for finish mills No. 1 and 3, are mounted on turntables, so that they can draw clinker either direct from storage for Type I and III and masonry cements, or from the silos for Type II, low-alkali, etc. Three 12- by 30-in. Waytrols feed gypsum to the mills. There is a 24-by 48-in. Waytrol for limestone when masonry cement is made in Mill No. 1.

The feeders discharge the clinker, gypsum, and limestone or additives for certain cements onto three mill feed belt conveyors, the gypsum *via* short belts for mills No. 1 and 3. Each of these three belts can also be fed air-entraining materials. The feeders for each mill are interlocked for any desired proportions, and the rate of feed is automatically controlled by a Milltronics Ltd. sonic intensity control, or electric ear. Each ear has a soundproof enclosure, so that its operation will not be affected by the noise from adjoining mills.

The three 12- by 36-ft. Nordberg 2-compartment finish mills are also identical in other respects (including drives) with the two raw mills previously described. Each is loaded with 200 tons of 1¼- to 3½-in. grinding balls and is driven at 15.5 r.p.m. by a 2500-hp. 200 r.p.m. General Electric synchronous motor.

Each mill is operated in closed circuit with a pair of 16-ft. Sturtevant air separators. (The largest separator on the market is 18 ft. in diameter as fan efficiency drops off rapidly in larger sizes because the blade tips reach critical speed; and a single 18-ft. separator was not large enough for these record-size mills.)

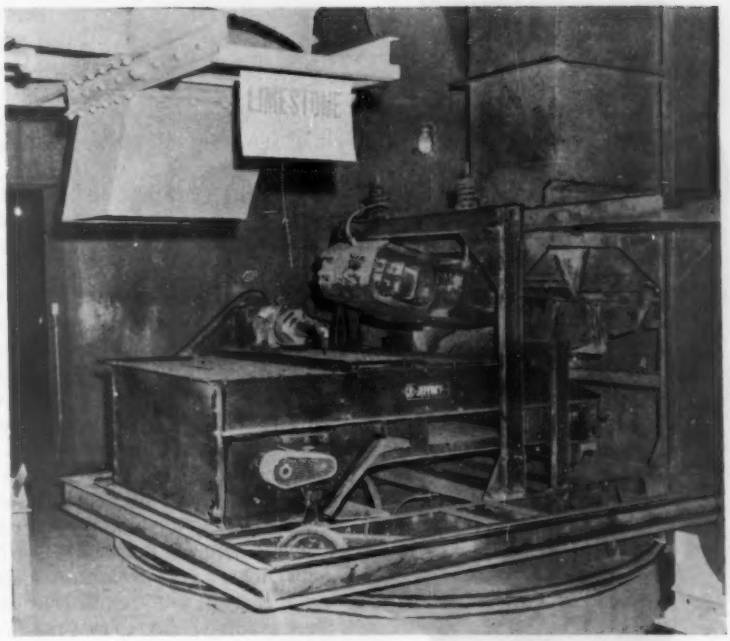
Discharge from the second compartment of each mill goes *via* an Airslide and a bucket elevator to an Airslide which feeds one separator direct and the other *via* another Airslide. At these last conveyors an automatic splitter divides the feed to two separators, this split being automatically and continually adjusted by the ampere loads on the separators.

Air released from each pair of separators goes to a 35,000 c.f.m. Norblo bag dust collector and *via* a fan to atmosphere. The mill outlets are connected to 16,000 c.f.m. Norblo dust collectors.

The coarse from the separators is returned by Airslides to the feed ends of the mills.

Each finish mill is equipped with an F. L. Smidth internal-spray cooling system to insure against dehydration of the gypsum, which might result in false set, etc. This system

A VIBRATING MILL FEEDER, on a turntable, which can draw clinker either direct from storage or from the silos.



vaporizes the water immediately in the mill through the use of compressed air. The spray cuts in automatically at 230 deg. and off at 220 deg. F., well within the 245-deg. and 212-deg. limits. This system has been used in Europe since 1946 and is now gaining rapid acceptance in this country.

The finished cement from the pairs of separators, with the dust from their collectors, is discharged by gravity to three 9-in. Fuller-Kinyon pumps. These feed to the cement storage silos.

Cement Storage Commercial cement is stored in eight 150-ft. high 5,000-ton capacity storage silos arranged in two rows of four each. Each transport line from the cement mills branches off into several silos in such a way as to give maximum versatility with a limited number of remote control valves.

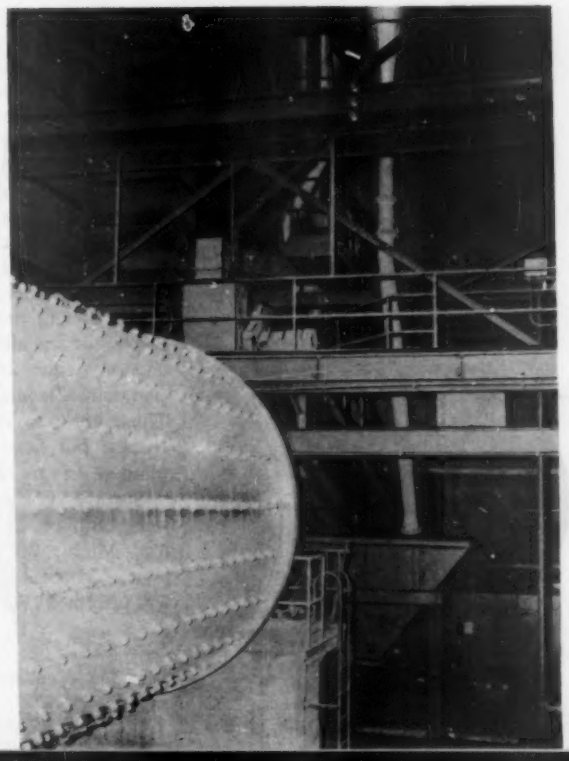
Airslides feed from the silos in each row to 10-in. Fuller-Kinyon pumps which transfer cement to a separate group of 12 custom silos, each having 1250-ton capacity, arranged in two rows of six each. These are used to supply state and custom demand and can be sealed.

There is a track under one row of silos for car loading, and trucks can be loaded under either row. Weighing is done on Fairbanks-Morse scales with 150-ft. platforms running the full length of the silos. The truck scale is a 60-ton unit, and the track scale a 150-ton unit. All truck scales are long enough so that a tractor-double trailer unit can be weighed at one time.

At the large commercial silos, bulk cement can be loaded from the two end silos in each row direct to cars at one end and trucks at the other. Reversible belt conveyors 48 in. wide, with 45-degree troughed idlers feed bulk cement from any of the silos in each row to cars or trucks. There is one spout in each of the four truck-loading aisles and one in each of the two car-loading aisles, each capable of loading out 300 t.p.h. Weighing is done on 80-ton Buffalo scales with 100-ft. platforms under each of the four truck-loading points and 75-ton scales with 60-ft. platforms under the two car-loading points.

Bagging The bag-loading arrangement is designed for both drive-through double and back-up single trucks, under cover. These St. Regis 4-tube bag packers are located under the interstices between the silos, and each of these can draw through Sprout, Waldron rotary feeders and Kennedy-Van Saun ceramic plate air conveyors from the four adjacent silos. A total of 30 such feeders and 11 Fuller two-

ONE OF THE THREE FINISH MILLS, with the feed conveyor belt in the background. Above are the two 16 ft.-diameter air separators which receive material from the second compartment of the mill. Air conveyors below return coarse material to the first compartment. The pump on the floor level transfers finished cement to the storage silos.



KILN CURTAINS
OF PROTECTIVE RAY-FOIL SPEED MAINTENANCE WORK IN HIGH RADIANT HEAT AREAS...

RAY-FOIL is a highly flexible aluminum foil permanently laminated to a glass cloth fabric. It reflects radiant heat like a mirror reflects light. Where maintenance or installation work must be carried on under high radiant heat conditions, as on cement kilns, RAY-FOIL protects personnel and equipment, speeds repairs, reduces costly downtime, speeds production. Order RAY-FOIL in tailor-made curtains, or in yardage or full roll lots. Also availabe with canvas or asbestos backing. SAMPLE SWATCHES ON REQUEST.

FROMMELT
FROMMELT INDUSTRIES, INC.
DUBUQUE, IOWA
A NAME TO REMEMBER IN APPROVED SAFETY PRODUCTS

Enter 132 on card, page 257

way valves are used in the two silo installations. Each packer has a capacity of 1,500 bags per hour. The packers are elevated so that bags slide by gravity to retractable loading belts. Boxcars are loaded from two of the packers.

Cement, both bulk and bagged, is loaded with unusual speed, and a unique system is used to facilitate dispatching. The truck scales have the usual dials for the loaders, but print the weights remotely at the sales office at the plant entrance. A dispatch clerk types up the bill of lading while the trucks are loaded and has it ready for the driver, *via* a pneumatic tube, when he is on the way out. The driver signs a copy and puts it back in the tube. Each truck is identified by a code signal system, so that it will get the right ticket; but to insure against error, there is a TV camera at each truck loading point, so that the clerk can double check.

Each of the eight main silos and each set of four of the 12 custom silos is vented to a 3,500 c.f.m. Norblo bag filter. There are six 7,000 c.f.m. American Air Filter bag filters for bulk loading and three 6,000 c.f.m. Norblo bag filters for bag filling.

Sales and Distribution It was a part of the original plan to distribute cement from this plant over a wide marketing area, both by land and water. The first step in this direction was the completion in October, 1959, of a distributing station at 95th Street and the Calumet River in Chicago. This facility has two quadrated silos with a combined capacity of 10,000 tons and is so designed that future packing facilities can be added. This plant is now receiving cement by rail, but it can also receive by water. Shipments from this center can be made by rail or truck.

Similar installations of 2,400-ton capacity each are now being completed in Cleveland and Cincinnati. These are now receiving cement by trucks, but later they will be supplied largely by rail.

Storage silos and a shipping dock were built on Lake Erie near Monroe, Mich., 20 miles east of the plant. Much of the plant's output will ultimately be shipped from this point by water. This dock was used for the receipt of 20,000 tons of cement for the construction of this plant, from the St. Lawrence Cement Company's Clarkson plant.

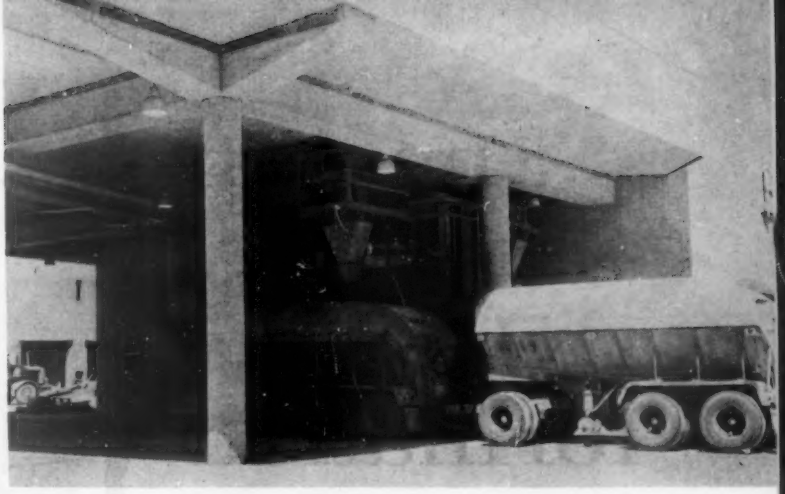
Laboratory With much of the plant control testing done in the mill and kiln control rooms, the load in the main laboratory is considerably lessened. It is, however, a modern and complete laboratory equipped to make all the necessary tests. Besides the initial cement laboratory equipment these items can be mentioned: a Galileo (Italy) semi-automatic tensile tester, a Dyckerhoff Blaine apparatus with electronic control of starting and stopping, a Perkin-Elmer flame photometer, and three Nettler Gramatic scales.

Dust Collection Although this plant is located far from any settled community, every possible step has been taken to make it dustless and attractive for the employees, visitors, and others. There are 35 individual dust collectors and three dust-suppression installations. Dust control begins at the secondary crushing department, where a bag filter is used.

At the primary and secondary crushers and at the point of withdrawal from the stone surge stockpile, there are spray dust-control installations which make this material almost dustless to handle in following stages.

In the kiln department there are four bag filters, two cyclone-type collectors, and the electrical precipitators for the kiln exhaust gases. Six bag collectors are used in the finish-grinding department, and there are 20 in the packing and loading departments.

Water Supply In order to insure an adequate year-round supply of water, the plant has its own source from a small creek which has been dammed to form a lake holding a three-month supply. There is a complete purifying and settling system for industrial water and treatment for domestic water. Pressure is provided by a 60,000-gal. Chicago Bridge spherical tank on top of the main storage silos.



BULK LOADING. Bulk cement truck being loaded direct from the large commercial silo. The entire unit is weighed on a scale with a 150-ft. platform.

Electrical Power Electrical power is purchased from the Detroit Edison Company and is brought in at 40,000 volts to main transformers on the property. Voltage is stepped down to 4,800 for the large motors driving the major equipment and to 440 v. for the smaller motors. Magneblast circuit breakers are installed on all transformers and non-flammable coolants are used. There are 329 motors of 1-hp. or over in this plant, with a total of 29,000 horsepower.

Credits Darin & Armstrong, Inc., Detroit, Mich., was the general contractor for this project, who co-ordinated the work of the different subcontractors. All silos and the secondary crusher building were erected by the Nicholson Company by the slip form method, and the kiln stack was built by the Rust Engineering Company. General Electric supplied most of the motors (255), including the mill motors, as well as the motor control centers and switchgear. Leeds & Northrup instruments predominate. Belt conveyors were supplied by the Link-Belt Company and apron conveyors and elevators by the Chain Belt Company.

Personnel The president of the Dundee Cement Co. is Dr. Hans Gygi, who is also a director of Holderbank Financiere Glaris, S.A., and managing director of the Holderbank Cement Works. Officers are: Roblee B. Martin, vice-

These are fifty-nine reasons...

59

Allentown Portland Cement Company	EVANSVILLE, PA.
Alpha Portland Cement Company	CATSKILL, N. Y.
	JAMESVILLE, N. Y.
	LIME KILN, MD.
	MARTIN'S CREEK, PA.
Arkansas Cement Co.	FOREMAN, ARK.
Calaveras Cement Company	SAN ANDREAS, CALIF.
California Portland Cement Company	COLTON, CALIF.
Canada Cement Company	EXSHAW, ALBERTA, CAN.
Coplay Cement Manufacturing Company	COPLAY, PA.
Dewey Portland Cement Company	TULSA, OKLA.
Ft. Scott Hydraulic Cement Company	FT. SCOTT, KAN.
General Portland Cement Company	DALLAS, TEXAS
	HOUSTON, TEXAS
	LAKE CHARLES, LA.
	PAULDING, OHIO
	STERLING, FLA.
	TAMPA, FLA.
Gresik Cement Company	EAST JAVA, INDONESIA
Hawaiian Cement Company	HONOLULU, HAWAII
Hercules Cement Company	STOCKERTOWN, PA.
Keystone Portland Cement Company	BATH, PA.
Lake Ontario Portland Cement Company	TORONTO, ONTARIO, CAN.
Lone Star Cement Corporation	BONNER SPRINGS, KAN.
	DALLAS, TEXAS
	HOUSTON, TEAXS
	HUDSON, N. Y.
	NEW ORLEANS, LA.
Louisville Cement Company	SPEED, IND.
Marquette Cement Company	BRANDON, MISS.
	MILWAUKEE, WIS.
Medusa Portland Cement Company	WAMPUM, PA.
Miron & Freres, Limited	MONTREAL, QUEBEC, CAN.
Mississippi Valley Portland Cement Co.	VICKSBURG, MISS.
Monarch Cement Company	HUMBOLDT, KAN.
Monolith Portland Cement Company	MONOLITH, CALIF.
North American Cement Company	HOWES CAVE, N. Y.
Northwestern States Cement Company	MASON CITY, IOWA
Oklahoma Cement Company	PRYOR, OKLA.
Penn-Dixie Cement Corporation	NAZARETH, PA.
	PENN-ALLEN, PA.
	WEST WINFIELD, PA.
Permanente Cement Company	CUSHENBERRY, CALIF.
	WAIANAE, HAWAII
Phoenix Cement Company	CLARKDALE, ARIZ.
Pittsburgh Coke & Chemical Corporation	PITTSBURGH, PA.
Riverside Cement Company	CRESTMORE, CALIF.
St. Mary's Cement Co., Limited	ST. MARY'S, ONTARIO, CAN.
Santa Cruz Portland Cement Company	DAVENPORT, CALIF.
Southern Cement Company	BIRMINGHAM, ALA.
Southwestern Portland Cement Company	ODESSA, TEXAS
	EL PASO, TEXAS
Standard Lime & Cement Company	MARTINSBURG, W. VA.
	PLEASANT GAP, PA.
Texas Industries, Incorporated	MIDLOTHIAN, TEXAS
Universal Atlas Cement Co.	BUFFINGTON, IND.
	LEEDS, ALA.
	NORTHAMPTON, PA.
Whitehall Cement Company	CEMENTON, PA.

POWER-CURVE BELONGS IN YOUR CEMENT PLANT

These 59 cement mills are equipped with high speed Power-Curve conveying systems taking bags directly from packing machines to box cars and trucks. In direct loading or palletizing, this versatile equipment increases capacity and cuts loading costs to 8 cents per TON.

Write for literature:

( ) Bulletin #50 Car and Truck Loading
( ) Bulletin #60 Bag Flatteners
( ) Bulletin #30 Palletizing Equipment
( ) Bulletin #35 Bag Systems

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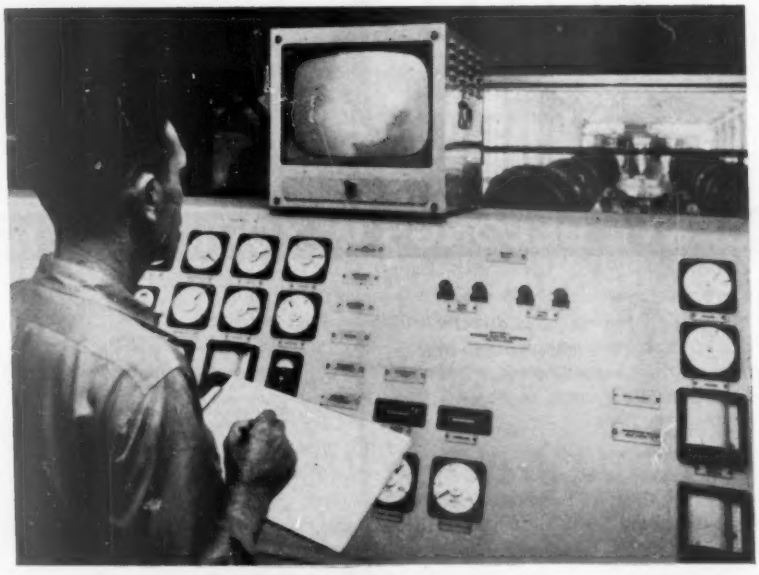
"...he can continually view the formation of the clinker"

(at Ideal Cement Company's Houston, Texas; Ada, Oklahoma; and Tijeras, New Mexico, plants)

One man at each of these three new Ideal plants can continually check the kiln burning operation using Diamond TV. Thorough instrumentation plus this continuous visual checking gives him close control over the manufacturing operations. And, because he constantly watches the clinker formation, the operator can make prompt adjustments as needed . . . helping to make possible a better product at lower cost.

There are many other ways you can utilize Diamond TV — such as in quarrying and crushing operations, viewing conveyor belts, at transfer points and in storage and shipping operations.

Why not let Diamond's trained application engineers show you how cost cutting Diamond industrial TV can bring greater efficiency to your own plant operation? Request Field Survey FS14A. Phone Lancaster, Ohio, OLive 3-6540 or TWX 490 — TODAY.



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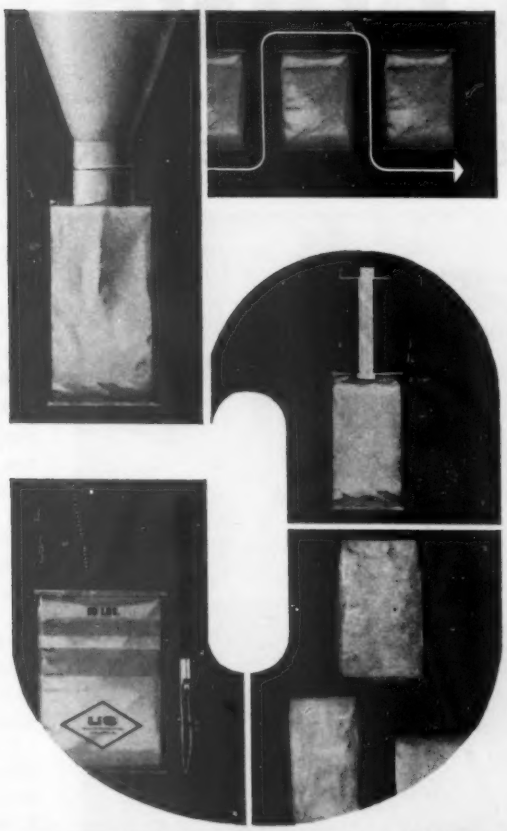
every year hundreds of multiwall users reduce total packaging costs thru UNION-CAMP'S



5 STAR PLAN

...and this comprehensive packaging service is free!

Whether you use multiwall bags by the thousands or hundreds of thousands, UNION-CAMP's Packaging Efficiency Plan offers you impressive cost reductions. And in 5 different ways!

One is a *plant survey*—a professional analysis of your complete packaging and materials handling operation. Another is *bag construction*—improvements in structural design that can often result in substantially reduced basis weight or less breakage. A third is *bag design*. Last year over 125 firms received greater merchandising impact from their multiwalls through this one service alone!

Fourth is *specifications control*. This covers standardization of multiwall bag styles, elimination of unnecessary odd sizes and the freeing of valuable warehouse space.

And finally, *packaging machinery*. By following recommendations made by UNION-CAMP engineers, dozens of companies have speeded their bagging and handling rates...saved thousands of dollars in lowered labor costs.

The 5-Star Plan is free. And it's available to you regardless of the brand of multiwalls you now use.

How much could it save you?

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MULTIWALL BAGS
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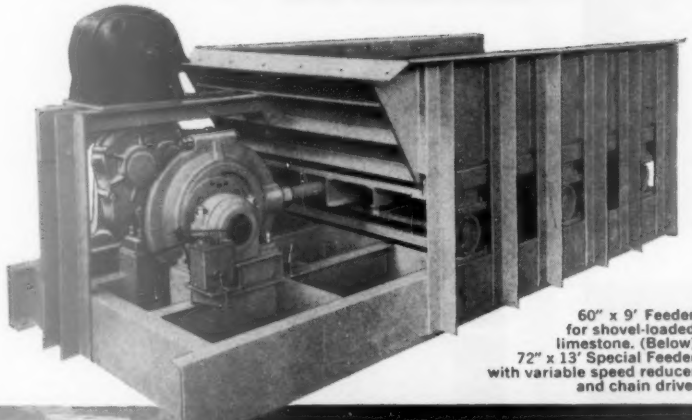
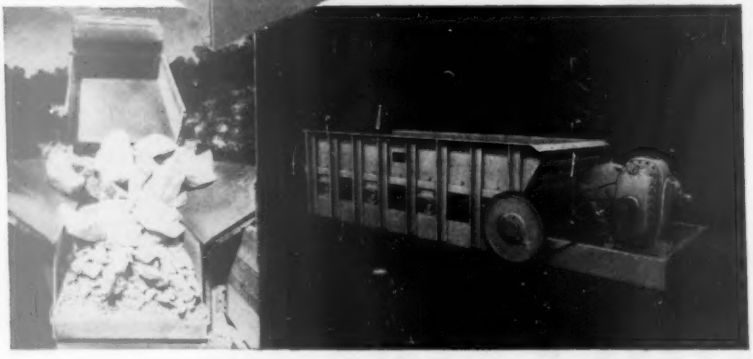
★ BAG DESIGN · BAG CONSTRUCTION · SPECIFICATIONS CONTROL · PACKAGING MACHINERY · PLANT SURVEY

LOW COST FEEDING

from sand to shovel-loaded rock



60" x 9' Feeder for shovel-loaded limestone. (Below) 72" x 13' Special Feeder with variable speed reducer and chain drive.



Built for lower operating costs and long service, these machines feed uniformly controlled quantities of materials. *The result:* elimination of choke-ups, overloads, wear and tear on the feeder as well as on other plant machinery. *Get the facts from Bulletin FRE-57.*

McLANAHAN SINCE 1835

RECIPROCATING-PLATE

FEEDERS

McLANAHAN & STONE CORPORATION

Hollidaysburg, Pennsylvania

Enter 136 on card, page 257

president and general manager, who is responsible for this operation in all phases; and Boyd W. Yard, secretary-treasurer.

Werner Ostberg, plant manager, is a former F. L. Smidth man, who has had a wide experience in building and operating cement plants in all parts of the world. Raymond S. Chase is sales manager.

Others in key positions include the following: William R. Dersnah, production superintendent and chief chemist; Max Roper, maintenance superintendent; Thomas Oates, superintendent of services and safety; Leroy Tyler, general supervisor, raw materials; and Paul Bursha, master mechanic.

Major Expansion Project Launched by Huron at Alpena

A multimillion-dollar expansion program has been launched by Huron Portland Cement Company at Alpena, Mich., aimed at doubling the mill's production by 1975.

The current phase of the program includes the following items: a technical building, a finish-grind building, a 550-ft. boat slip with storage facilities for 250,000 barrels of cement, a harbor-deepening project, and a new 2,800-t.p.d. shale-handling system.

Company officials anticipated that within the next few months it will be possible to grind an additional 7,000 barrels of cement per day and to accelerate the handling and loading of the firm's fleet of ships.

The new shale facilities will provide for tht active storage of 6,130 tons of shale. The new finish department will be adjacent to the No. 2 and No. 3 grinding facilities, and will feature a 50- by 125-ft. 2,500 hp. Kennedy-Van Saun mill.

Cleaner bags, better housekeeping in packing areas, and improved working conditions are reported benefits from a new development in valve-type multiwall bags. Raymond Bag Corporation, working in conjunction with the North American Cement Company, has developed a method involving perforating the inner liner with a predetermined pattern of pin-holes. These replace the standard below-valve perforations, which were difficult to seal completely after filling a bag.

Modernizing Program Begun At Glens Falls Portland Plant

Construction is underway on a $1,250,000 packaging and bulk-loading department at the Glens Falls Portland Cement Company (a division of The Flintkote Company). new facilities will completely separate the packaging and bulk loading departments. The packaging plant is scheduled for completion this summer, and the bulk loading facilities by autumn.

The packaging plant will be equipped with automatic palletizing machines. There will be four four-compartment silos in the bulk-loading department, each with a 20,000-bbl. capacity.

A new $3,000,000 finishing mill, on which construction began last year, was completed early this spring, and a new $75,000 laboratory was opened shortly thereafter.

Efficiency Marquette's Aim For Nashville Modernization

Marquette Cement Manufacturing Company's plant at Nashville, Tenn., is in the process of a $5,000,000 modernization program. The remodeling job was undertaken to increase efficiency at the 1,000,000-bbl. plant It was begun about two years ago, and is scheduled for completion by the end of 1961.

Klug & Smith, Milwaukee, recently completed 18 new storage silos at Nashville. New raw and finish mills costing $500,000 are being installed. A 420-ft. kiln was completed a year ago.

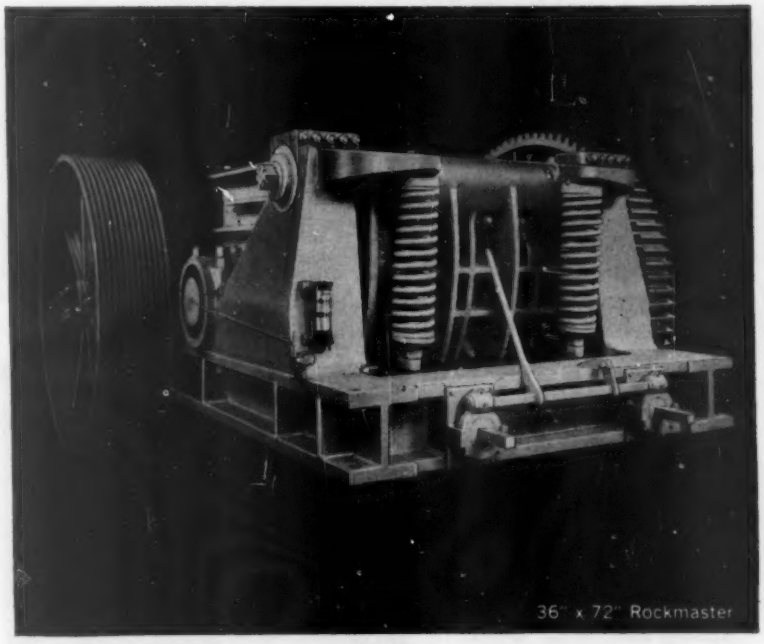
Transfer Point to Be Built In Oregon for Ideal Cement

Ideal Cement Company has purchased a site in Eugene, Oreg., for for the immediate construction of a cement transfer station. Bulk and sack rail shipments will be received from the firm's Gold Hill plant in southern Oregon.

Facilities will include two steel bulk storage bins, each with a capacity of 1,000 bbl., and a combination office and warehouse building:

Louisville Cement Company has been placed on the list of "Excellently Managed Companies" by the American Institute of Management.

world's MOST POWERFUL single-roll crushers



Widely used for primary and secondary crushing on the hardest and toughest kinds of shovel-loaded rock and ore, Rockmasters have high capacities and extraordinary ratios of reduction. Also they are the world's finest crushers for wet and sticky feed. Among outstanding design features: Automatic Steelstrut Toggle for release of tramp iron, and Quick-Adjustment for controlling size range.

Get all the facts from Bulletin RMTD-56.

McLANAHAN SINCE 1835

ROCKMASTERS

McLANAHAN & STONE CORPORATION

Hollidaysburg, Pennsylvania

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Business Prompts Expansions At New England Lime Company

Work is progressing on a new primary crushing installation at the Adams, Mass., plant of the New England Lime Co. It will replace a unit which has been in service for 30 years. Construction is expected to be completed by December.

Installation of a tube mill has been completed in the firm's fine-ground limestone plant, and work is underway on the expansion of precipitated chalk facilities, including a new dryer.

New England Lime has been operating the lime-burning facilities at near rated capacity, according to Chauncey C. Loomis, president, and accordingly has been doing considerable pilot work for future expansion. Engineering has been completed for the possible installation of another fluo-solids kiln of considerably larger capacity than those now in operation.

Earnings per share of common stock for the period ending March 31 were listed as 69 cents—an increase of 13 cents over the 56 cents a share for the corresponding quarter in 1959.

The Penn-Dixie Cement Corporation at Clinchfield, Ga., recently celebrated its fifth consecutive year without a lost-time accident. The rededication of the company's safety trophy was held at a company barbecue dinner. Out of the last 20 years, since the safety trophy program was begun, the Clinchfield plant has won the award 17 times.

Sand and gravel producers in the United Kingdom had the biggest year in the industry's history during 1959, according to the London *Financial Times*. An all-time high production of 55,000,000 cu. yd. was reached, compared with 49,000,000 cu. yd. the previous year.

Chlor-Alkali Division of Food Machinery Chemical Corporation management is planning another major expansion of soda ash output at the firm's Green River, Wyo., plant. Production will be expanded by 200,000 t.p.y., bringing total annual capacity to 750,000 tons. The first phase of the expansion is to be completed early in 1961.

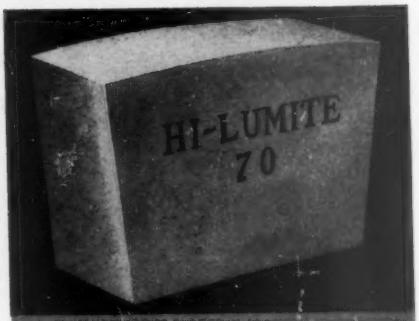
Eureka, Calif., is the site of a proposed bulk cement distribution plant to be erected for the Permanente Cement Company. According to Wallace A. Marsh, president, the plant will have a storage capacity of 3,000 bbl. of cement and will be the first such installation in the Eureka area. Cost of the structure will be more than $125,000.

Expansion programs contemplated by phosphate producing firms in Polk County, Fla., reportedly will total more than $23,000,000. The firms planning expansions include the Virginia-Carolina Chemical Corporation, the Davidson Chemical Company, W. R. Grace & Company, American Cyanamide Company, the American Agricultural Chemical Company, and International Minerals and Chemical Corporation.

NEW ERA IN HIGH ALUMINA REFRACTORY PERFORMANCE

Higher Bulk Density and Lower Porosity Big Plus Factors In

HI LUMITE 70 & 60 KILN LINERS



Extra value features resulting from the higher bulk density and lower porosity of Walsh High Alumina Refractories include:

- Increased Strength
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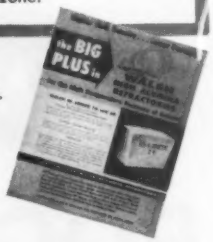
HI LUMITE 70— Dry Press Process Kiln Liners 70% Alumina content PCE 37-38

HI LUMITE 60— Dry Press Process Kiln Liners 60% Alumina content PCE 36-37

Assure excellent service in Hot zones of rotary Cement Kilns and Burning zones of Lime Kilns.

COMPOSITION: Carefully graded and selected minerals noted for non-shrinking qualities, further enhanced by the dry press process of manufacture, imparting uniformity in size and shape.

Also available—Mullitex Liners for intermediate zone use and Warco XXD for use in the cold zone.



Send for new bulletin. Contains technical data, table of standard 9" and 6" kiln liners and other useful information.

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SPECIALISTS IN REFRACTORIES OF HIGH BULK DENSITY AND LOW POROSITY

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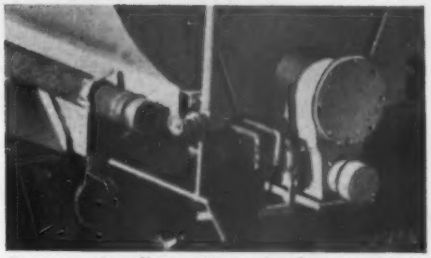
Model PMCT-1



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Spot trailer anywhere . . . full-length auger feed completely empties body from any position . . .

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BAUGHMAN CEMENT TRANSPORTS

This versatile Baughman transport discharges cement and other free-flowing bulk materials according to each job's need. **Blower method** can elevate cement up to 100 feet high at a rate of up to 1,300 lbs. per minute. **Straight mechanical discharge** into pit or conveyor discharges up to 2,000 lbs. per minute. Heavy-duty, 9" auger feeds from full length of body, allows complete unloading regardless of transport position. Leaves no residue to cake or harden.

Patented air cell relieves weight of full load on auger.

Specially designed automatic swing gate check valve prevents material from flowing back into blower.

Simple construction, no complicated metering devices. Material augered directly into air stream for faster delivery.

Let Baughman custom-build these trouble-free transports to your specifications.

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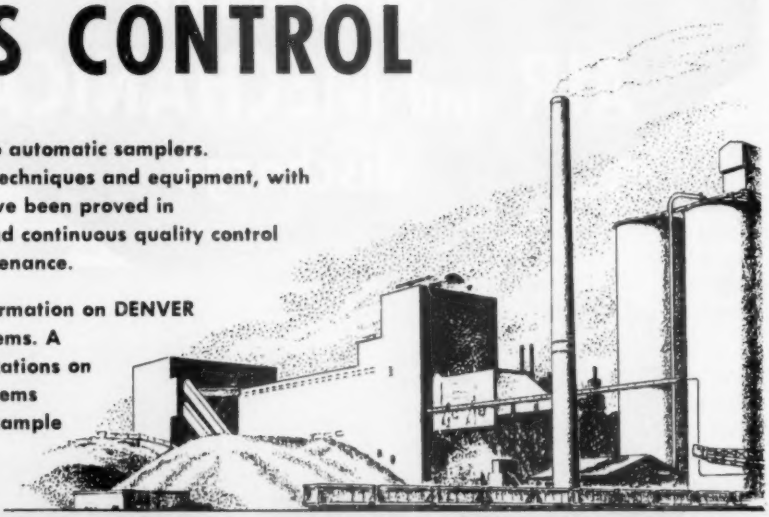
...and the trend in process control is to automatic samplers. DENVER has set the pace in sampling techniques and equipment, with a full range of types and sizes that have been proved in cement plant operation for accurate and continuous quality control at a low cost and with minimum maintenance.

Write, wire or phone for complete information on DENVER Samplers...or complete sampling systems. A set of 15 layout drawings with specifications on individual samplers and sampling systems sent on request. Complete laboratory sample processing equipment also available. Many units in stock.



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For Rock or Slurry Sampling...

DENVER Automatic Samplers

A compact unit designed to move the sample cutter through the stream at a uniform speed up to 30" per second to provide an accurate increment sample. Action of cutter and mechanism closely adheres to theoretical "perfect technique" in cutting a sample. High speed cutter travel eliminates need for secondary sampling. Units with cutter travel to 10' and longer. Dust-tight units and bottom dump cutters for use in restricted headroom areas available. Most models in stock for quick delivery.

For Dry Cement Sampling...

A self-contained, dust-tight unit designed to take increment samples from a vertical stream of dry materials at adjustable and predetermined intervals. Ideal for use with pneumatic conveying systems. Totally-enclosed, fabricated steel housing with seal between sample cutter and sample discharge chute to prevent loss or contamination by reject portion.

DENVER Automatic Vezin Samplers

DENVER EQUIPMENT COMPANY

1400 17th Street — Denver 17, Colorado — Phone CHerry 4-4466

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BULLETIN
G-11

Fuller Equipment

for the non-metallic mining and manufacturing industries

Automation with a variety of Fuller equipment at Lehigh Portland Cement Company's Union Bridge, Maryland, plant has helped triple plant capacity.

EQUIPMENT FINDER

Conveyors	1
Compressors, Pumps, Blowers	2
Coolers	3
Preheaters	4
Control Panels	5
Material-Level Indicators	6
Feeders and Valves	7
Safety Switches	8
Fans and Exhausters	9
Airmerge Blending	10

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....pioneers in harnessing AIR

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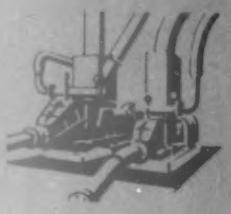
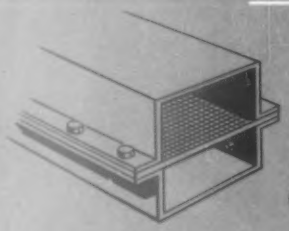
100 BRIDGE STREET, CATASAUQUA, PA.
Subsidiary of General American Transportation Corporation
Offices In Principal Cities Throughout The World

Fuller Equipment



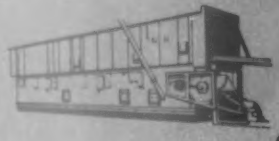
Fuller-Kinyon Pneumatic Conveying Systems. These systems offer unique overall plant economy for conveying such materials as bulk Portland cement, pulverized coal, limestone dust, and pulverized phosphate rock. Conveying is done pneumatically, anywhere a pipe line can be run—over long distances, to any number of delivery points, far beyond the practical limits of mechanical conveyors. Used not only for processing, but also for loading and unloading cars, ships and barges, mixing and blending dry-pulverized and granular materials. Installation involves no plant design problems. Systems are easily applied to existing plants, without interrupting production or interfering with structures and equipment. *Bulletin FK-26A.*



F-H Airslide® Fluidizing Conveyors. Without the use of moving parts, these revolutionary conveyors transport fine, dry bulk materials, with a minimum of abrasive wear on the conveyor. Porous supporting medium divides conveyor section into two "compartments". Dry material flows down inclined conveyor, fluidized by low-pressure air entering beneath porous medium. The Airslide Conveyor is easily installed, with simple floor or overhead support which releases valuable floor space for other uses. Operation is dustless and noiseless with extremely low power consumption. Conveyor line needs no lubrication, and is self-cleaning, so there is almost no maintenance. *Bulletin FH-2B.*

Fuller Rotary Compressors and Vacuum Pumps. Vibration-free, can be installed anywhere, even on balconies. Fewer moving parts mean minimum maintenance. Their unique features include extraordinary capacity with reference to size, weight and floor space requirements; direct drive at common motor and gas engine speeds without reduction gearing; no valves. Maintenance requirements are negligible, and they can operate continuously at full load for long periods without mechanical attention. All parts are readily accessible. Compressors and vacuum pumps handle air and gases from 30 to 3300 cfm at pressures to 125 lb. gage, or vacuums to 29.95 in. (referred to 30-in. barometer). *Bulletin C-5A.*

Sutorbilt Blowers and Gas Pumps. Accurately designed and built to deliver air or gas in capacities up to 20,000 cfm. Pressures or vacuums up to and including 12 pounds. Standard duty blowers are fitted with four anti-friction bearings, wide face timing gears. Heavy duty units are normally equipped with six anti-friction bearings. All blowers are complete with bases and are recommended for continuous service. Blowers and pumps can be furnished in the vertical design if desired, to facilitate piping arrangements. *Send for Bulletin.*

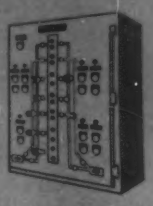


Fuller Horizontal and Inclined Grate Coolers. Compact, easily installed for fast, efficient cooling of such materials as nodulized phosphate rock, pebble lime, ores, dolomite, iron nodules and Portland cement clinker from 2800 F. or higher to any desired point within a reasonable range of atmospheric temperature. They include the latest advances in cooling, for use in many different industries where materials must be cooled after processing. They can also be used for coking. Each type—horizontal or inclined-grate, offers its own advantages. Most important is the fact that Fuller is careful to recommend the type best suited to your needs. *Bulletin CO-7.*

Fuller Preheaters, Humboldt Suspension Type. Used for preheating dry, pulverized Portland cement raw materials with rotary kiln waste gases, using a multi-stage suspension process. This draws the gases through a series of cyclone collectors. The material is fed counter to the gas flow. Upon entering the first cyclone stage, the material, continuously delivered and suspended in the gas stream, is successively collected and resuspended until it is discharged through the kiln-feed pipe. Gas and material contact time is thus prolonged, providing a high degree of heat recuperation with a very low temperature differential between gas and material at the final stage. Clinker production with relation to kiln volume is increased. There is lower fuel consumption and the useful life of kilns is extended. *Bulletin FF-3241-2.*

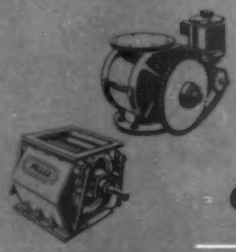
for every mining and processing need

The completeness of the Fuller line makes it possible to fit your needs exactly. Users will testify to the reputation of Fuller systems for cutting materials handling costs, and savings on installation and maintenance. Let us explain how they can pay off for you. Just write or phone our nearest office.



Fuller Control Panels. Permit automatic, remote, one-man control of multiple operations. Easily-read panel permits visualizing flow of material to storage or from process bins. Behind them is Fuller's vast materials handling experiences, as well as the instrumentation techniques that make possible true automation in materials handling. Fuller is the only company manufacturing pneumatic conveying equipment to engineer and build its own control panels. This single responsibility for both system and control can mean substantial savings in time and cost. It insures controls inherent to the system, not adapted to it, with no unnecessary components. Coordinated operation of both system and control is assured. *Bulletin E-9.*

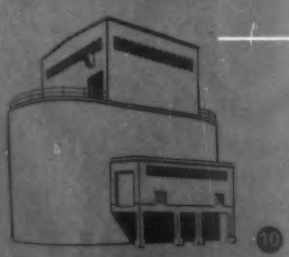
Fuller Material-Level Indicators. These indicators signal audibly and visibly when materials reach a predetermined high or low level. Mounted on the bin cover, with rotating sensing paddle suspended in the bin, they control conveyor motors, valve circuits, etc. Main working parts are sealed in a dust-tight casing. Available for horizontal mounting, model SG-4X is approved by Underwriters Laboratories, Inc. for use on Class II, Groups E, F, and G—hazardous dust locations. *Bulletin I-5-C.*



Fuller Vane-type and Roll Feeders . . . and Rotary Valves. For volumetrically controlled feeding of a wide range of dry pulverized or granular materials. Fuller Rotary Valves are used under silo deck slabs and bins to permit the free flow of pulverized materials which tend to arch, such as lime and cement raw materials. Free movement of the rotor to open and closed positions is assured by careful machining and alignment of the trunnion shafts and dust-tight bearings. Leakage in the closed position is prevented by close tolerances and a double seal. Knife edges and "V" slots at the end of the rotor avoid sticking of packed materials. Built for either manual or motor drive, remotely controlled. These valves can be mounted in the horizontal or vertical position. *Bulletin F-5A.*

Fuller Motion Safety Switch. This switch is an automatic safeguard against damage to machines, equipment and processes, resulting from stoppage or reduced speed. It will control a motor circuit, or operate such warning devices as a signal light, horn or bell. It is almost foolproof, and requires little attention. This switch will stop one machine which is serving another if the latter machine should stop accidentally, before further damage occurs. Where the original stoppage is caused by a minor accident, such as a slipping belt or broken chain, the switch limits repairs to correcting what originally caused the stoppage—often nothing more than the tightening of a set screw or removal of foreign material. *Bulletin MS-2.*

Lehigh Type I. E. Industrial Fans. Lehigh Type I.E. Industrial Exhausters are of rugged design in mild steel plate construction. The wheels are of the long shaving type. In all welded construction they are precision balanced both statically and dynamically for vibration-free operation. These Exhausters are ideal for handling clean or dust-laden air or gases at temperatures up to 600°F. All units are available in standard or heavy duty construction. *Bulletin L-5.*



Fuller Airmerge Systems. The Fuller Airmerge system rapidly blends dry raw materials in large bulk lots by air into a completely homogenized mix. Variations in components as high as 2% are quickly reduced to as low as 0.2%. Capacities—60 tons and upward. Operating Principle: The floor of the silo is divided into four individually-controlled, aerated quadrants. By aerating one quadrant more strongly than the others, the column of material over that section becomes less dense and is displaced by the more dense (less aerated) material over adjoining quadrants. This is repeated with each quadrant in automatic rotation, creating active vertical circulation. Applying air to active quadrants in pulses achieves a high degree of fluidity with a minimum amount of air. *Bulletin B-2.*

FULLER-KINYON and FULLER-FLUXO PUMPS—
For conveying dry pulverized materials.
FULLER-KINYON REMOTE-CONTROL UNLOADERS—
For unloading dry pulverized materials from box cars, ships, barges, and flat-bottom storage bins.
F-H AIRSLIDE® FLUIDIZING CONVEYORS—
For fine, dry materials.
AIRSLIDE® PUMPS
FULLER DUAL FEEDER TRANSFER UNITS
FULLER AIRSLIDE® TRANSFER UNITS

products of FULLER COMPANY

FULLER AIRVEYOR® PNEUMATIC CONVEYING SYSTEMS—
For unloading, conveying and reclaiming fine, granular, and crushed materials
FULLER AIRMERGE BLENDING SYSTEMS
FULLER ROTARY COMPRESSORS and VACUUM PUMPS
SUTORBILT ROTARY POSITIVE-PRESSURE BLOWERS . . . GAS PUMPS . . . VACUUM PUMPS
LEHIGH® TYPE I. E. FANS
LEHIGH® INDUCED-DRAFT FANS
FULLER PREHEATERS—Humboldt Suspension Type
FULLER INCLINED-GRATE COOLERS
FULLER HORIZONTAL-GRATE COOLERS
FULLER CLINKER BREAKERS
FULLER ROTARY FEEDERS and ROTARY VALVES
FULLER CONTROL PANELS
FULLER MATERIAL-LEVEL INDICATORS
FULLER MOTION SAFETY SWITCHES
FULLER AERATION UNITS
FULLER DIVERTING VALVES
FULLER-DRACCO DUST COLLECTORS
TRAYLOR GYRATORY, ROLL and JAW CRUSHERS
TRAYLOR BALL, TUBE and ROD GRINDING MILLS
TRAYLOR ROTARY KILNS, DRYERS and SLAKERS
TRAYLOR FEEDERS: COPPER CONVERTERS

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Traylor

MACHINERY FOR THE CEMENT INDUSTRY

Traylor kilns

feature

Operating Economy
Advance Design
Rugged Dependability

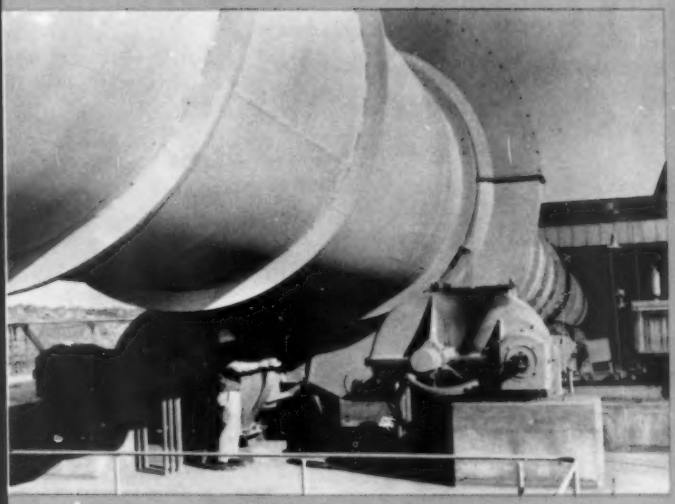


Photo above shows dual drive on a 15' x 450' Traylor Rotary Kiln in a West Virginia cement plant.

Rotary Kilns • Mills • Coolers • Dryers
• Jaw Crushers • Gyratory Crushers
Feeders and special machinery
for the mining and metallurgical industries.

TRAYLOR ENGINEERING & MANUFACTURING
DIVISION OF FULLER COMPANY
1556 MILL STREET • ALLENTOWN, PA.

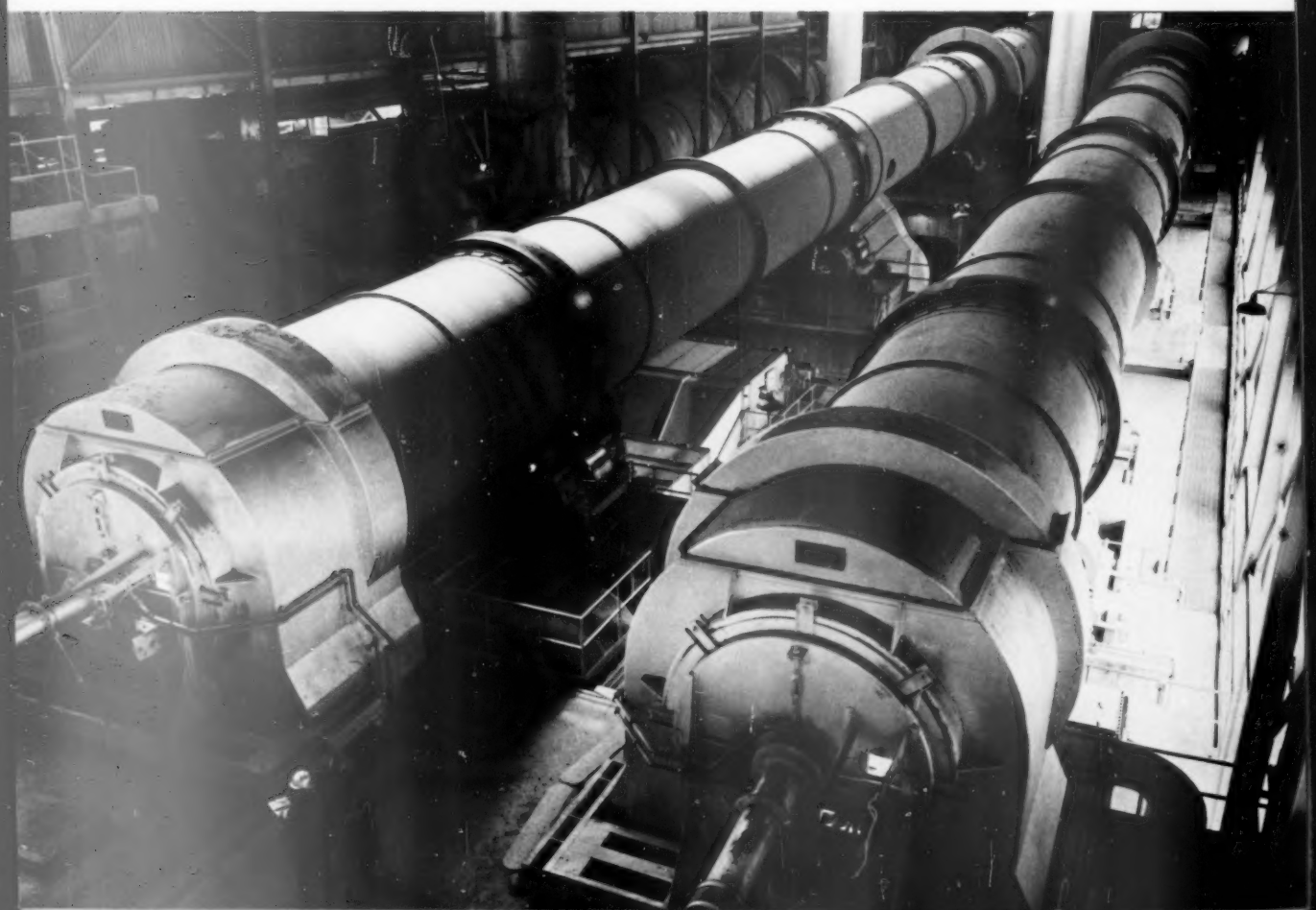
TGB-1

ROTARY KILNS

ARE USED BY THE WORLD'S BIGGEST PRODUCERS FOR OPERATING ECONOMY, LOWER MAINTENANCE AMD HIGHER PRODUCTION.

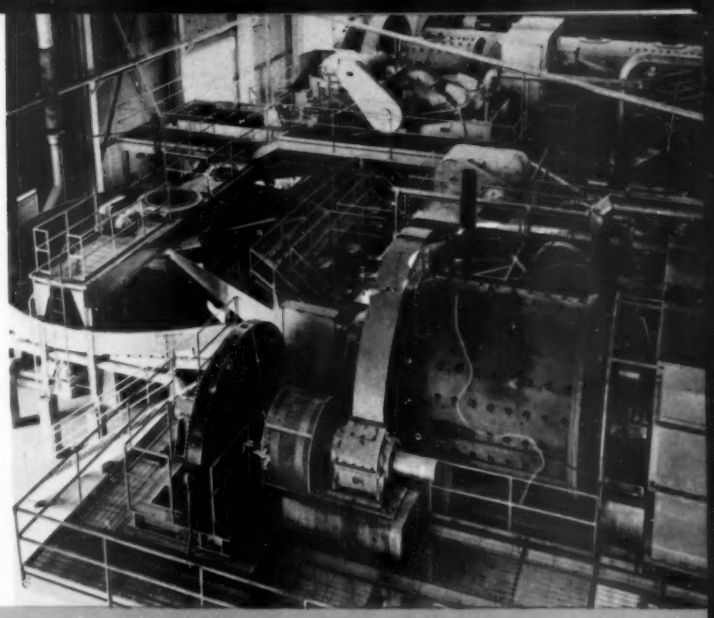
The modern design and engineering excellence of Traylor kilns is the result of over 50 years' experience in specializing in machinery for the mining and processing industries. The kiln shells are fabricated with heavy steel plate, automatically welded. Alignment is maintained by easily adjustable supports. The riding rings are full floating type, forged or cast steel, mounted on machined pads turned true and smoothly faced. The steel main gears and pinions are generated to a special design in Traylor shops and are reversible. Traylor kilns are available in any size depending on the specifications and capacities desired. Write, outlining your requirements, and our engineers will send you their recommendations and kiln Bulletin No. 1115.

SHOWN BELOW—two 11′ - 3″ x 300′ rotary kilns in a Pennsylvania cement plant.



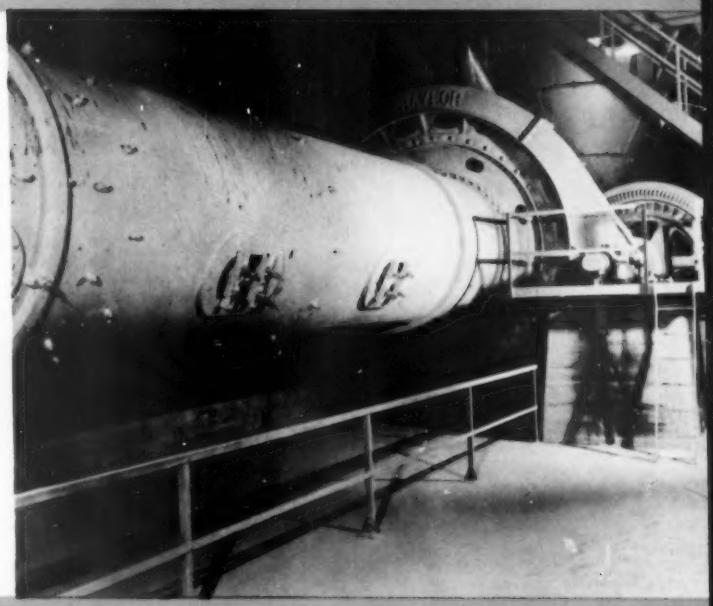
BALL MILLS

Traylor ball mills are made in both overflow and diaphragm discharge types. Shells are welded steel with detachable heads of cast steel. These modern mills grind efficiently to 200, even 325 mesh.



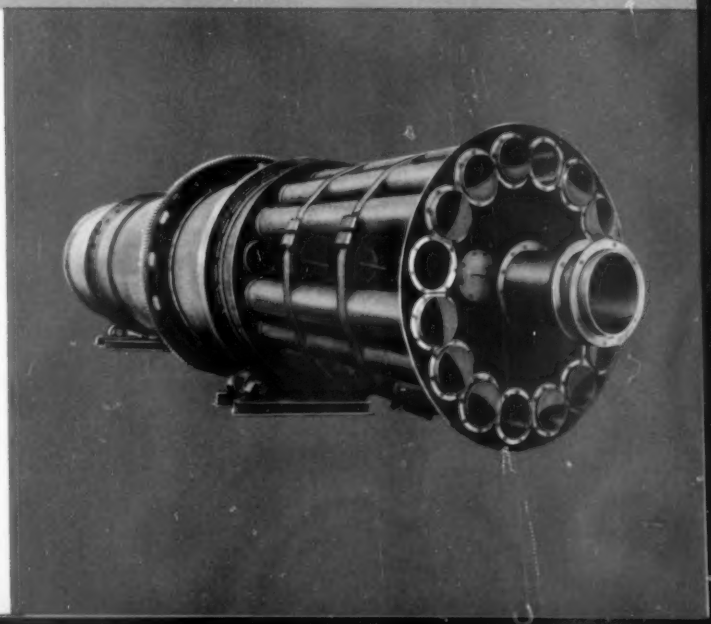
COMPARTMENT MILLS

Mills can be made in compartments, partitioned by suitably slotted diaphragms to separate different size grinding media, allowing the product of each compartment to advance to the next grinding stage within the same machine. Several operations are completed with a single source of power and drive.



COOLERS AND DRYERS

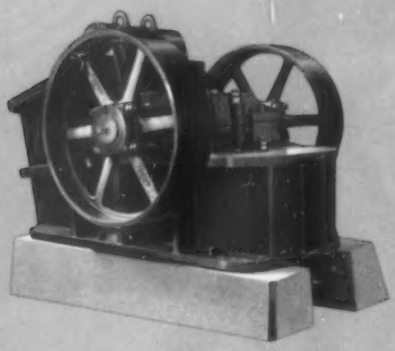
Traylor rotary coolers are made in the conventional, diaphram and multiple tube design and employ the same construction features as Traylor kilns. Rotary dryers, direct or indirect fired, are designed to meet specific requirements.



GYRATORY CRUSHERS

Traylor is the world's largest manufacturer of giant 60″ gyratory crushers and is equally famous for fine reduction crushers. All gyratory crushers are built with Traylor's famous original bell heads and curved concaves. Application of power as a direct crushing force drastically reduces power requirements at all settings. Write our engineers outlining your requirements.

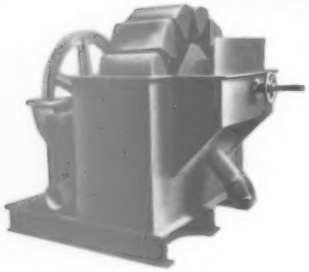
JAW CRUSHERS



The features of the Traylor jaw crusher include the original curved jaw plates allowing for greater capacity at finer settings resulting in longer life of wearing plates. The frames are reinforced at critical points to provide strength. All the parts in a Traylor jaw crusher are readily accessible. Write, outlining your product size and capacity requirement, and our engineers will send you their recommendations.

FEEDERS

Traylor feeders for wet or dry materials in open or closed circuit operation.



SLURRY FEEDERS

A self-contained, fully closed ferris wheel type feeder for accurately supplying constant volume of slurry to kilns and mills. The tank and hopper are a single welded unit. Sizes from 36″ to 84″.

Write for Bulletin No. 2114 for details on feeders.

TABLE FEEDERS

For accurate regulation of feed to mills, kilns and dryers. The revolving table receives material at its center through an adjustable telescopic feed spout. The Traylor table feeders are built in sizes from 2′ to 10′ in diameter.

Traylor

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clean stack at Dragon Cement!

DRACCO GLASS-BAG FILTER HALTS AIR POLLUTION BY COLLECTING KILN DUST AT 600° F.

The unretouched photograph shows the dramatic result produced by a Dracco Glass-Bag Filter at Dragon Cement Co., division of American-Marietta Co., Northampton, Pa.

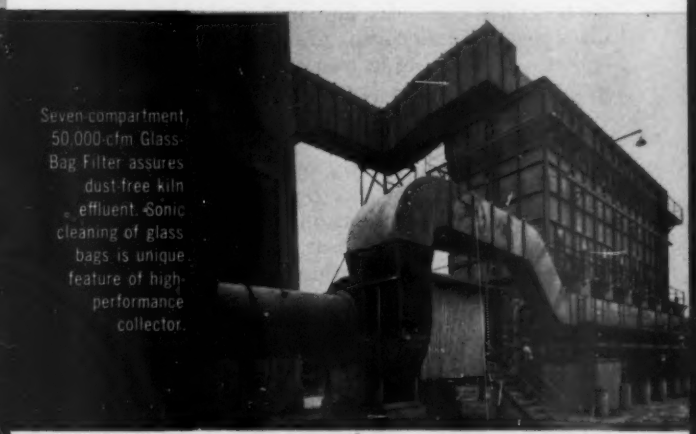
The kiln is running at full capacity—but no visible dust is escaping from the stack connected to the Glass-Bag Filter. The filter is collecting the extremely fine dust with virtually 100% efficiency. Duplicate equipment has been ordered to eliminate visible dust from the other stack.

Convinced that this is the best answer to air pollution from kiln stacks, Dragon has ordered three more Glass-Bag Filters. Soon all stacks will be clean at Dragon!

Exclusive dust removal techniques assure extra-long bag life. At Dragon, Dracco's patented SONOCLEAN unit safely cleans the bags with sonics. Sound waves gently dislodge dust without wear or fracture of the cloth.

Modular, compartmented design gives flexibility to meet any capacity requirement and simplifies servicing. Worker comfort during servicing is assured by interior insulation.

Dracco Glass-Bag Filters, the first successful glass cloth collectors, are now collecting hot, corrosive dust and fumes in many industries—cement, chemical, metallurgical. Gases to 600° F. can be introduced into the filter where specially treated glass bags retain all visible dust.



Seven-compartment, 50,000-cfm Glass-Bag Filter assures dust-free kiln effluent. Sonic cleaning of glass bags is unique feature of high-performance collector.

For further information on Glass-Bag Filters, today's most advanced equipment for air pollution or hot dust problems, contact: Dracco Division of Fuller Company, Harvard Avenue and E. 116th Street, Cleveland 5, Ohio.

DRACCO *airstream* conveyors
dust control equipment

FULLER COMPANY CATASAUQUA

CEMENT PLANT A IN PRODUCT USE

• Ideal matches utility with beauty to house modern production complex

IT would be difficult to say with certainty whether Ideal Cement Company takes more pride in the architectural beauty of its impressive new plant at Ada, Okla., or in the outstanding modern operating design and production technology involved in the 3,000,000-bbl. facility.

There is ample justification for either, but the important point is that Ideal's management stands firm in the belief that a complex, huge manufacturing operation can, through striking utilizations of its own product, be its own best salesman. The concentration on developing advanced production techniques which has made this firm a leader in the industry has been paralleled by the unusually attractive construction of each plant built by Ideal in its current 10-year expansion program.

As an important factor in the latter program, which was started in 1955, the new Ada plant represents an investment of more than $20,000,000 and assumes a major role in the firm's present overall capacity of 37,000,000 bbl.

Together, the new operation and its older companion at this location are capable of producing 5,500,000 bbl. annually. Although located on the same site, the old and the new are physically separate—only raw material supply is common to both.

By BUREN C. HEROD

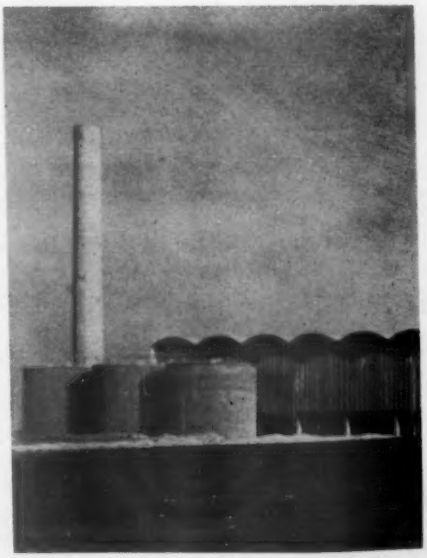
Features From an operating standpoint, the primary features involve control and raw material supply systems. Regarded as one of the most highly instrumented and mechanized operations in the industry, the Ada plant is controlled entirely — from quarry to product storage—from a single centralized control room. Unique in this system is the widely publicized 5½-mile long conveyor installation which transports raw material from the quarry to the plant.

This installation, described as the longest permanent overland belt conveyor ever built, also displays an interesting application of concrete —one that is said to be the first of its type. All seven flights in the system incorporate prestressed lightweight concrete channels which provide both support and cover for the belting and idlers for the entire length.

The extensive use of concrete for utility, such as above, in attractive physical expressions is one of the most impressive facets of the overall plant. Long prestressed girders (up to 111 ft.) and pillars as high as 97½ ft., also of prestressed concrete, carry the plant feed conveyor system to the top of slip-formed concrete silos.

General plant construction involved arching roof sections on the kiln building, cast in place with the use of portable forms, and precast louver sections with external stiffeners. Slurry tank walls were prestressed by wrapping .162-in. diameter wire around the shell, and stressing the wire to 140,000 p.s.i. tension as it was wrapped.

Another outstanding feature of the operation is the extensive dust-control. There is a total of 41 collection systems installed at strategic points throughout the plant. These include everything from the combination cyclone-precipitator unit for the kilns, to the collectors installed at various material transfer and processing points. More than $1,500,000



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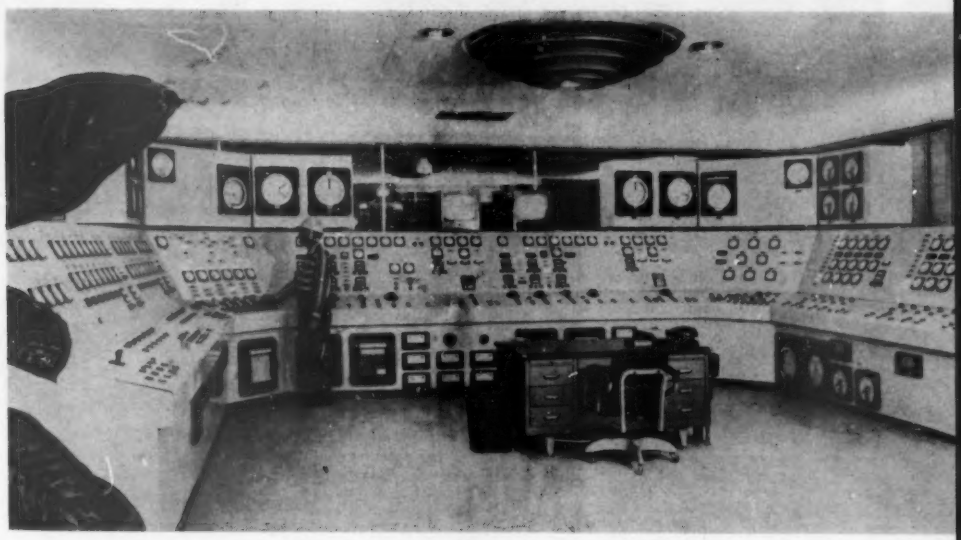
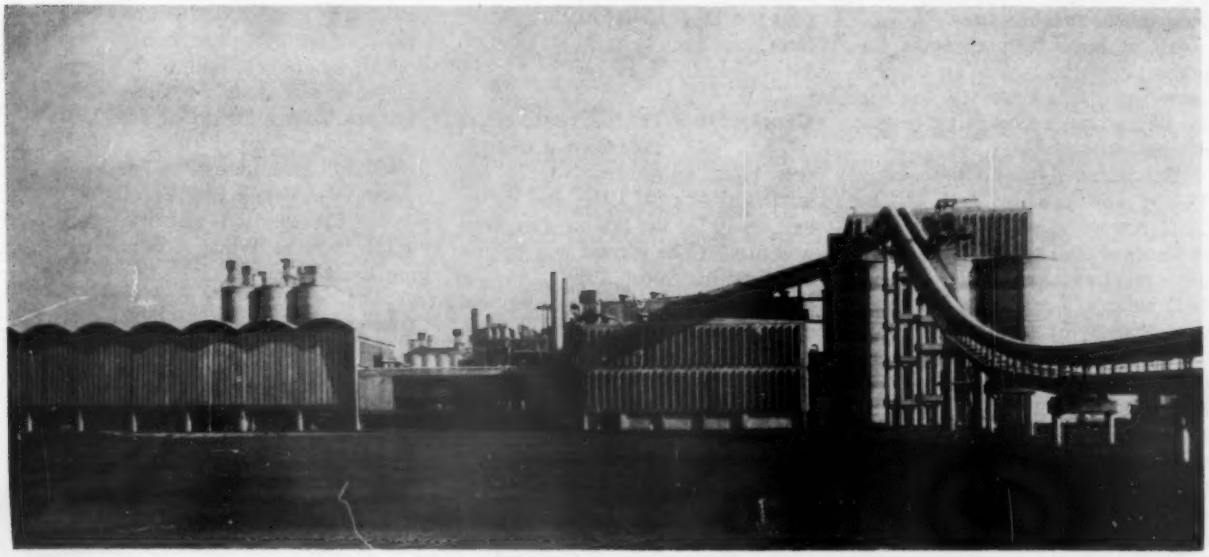
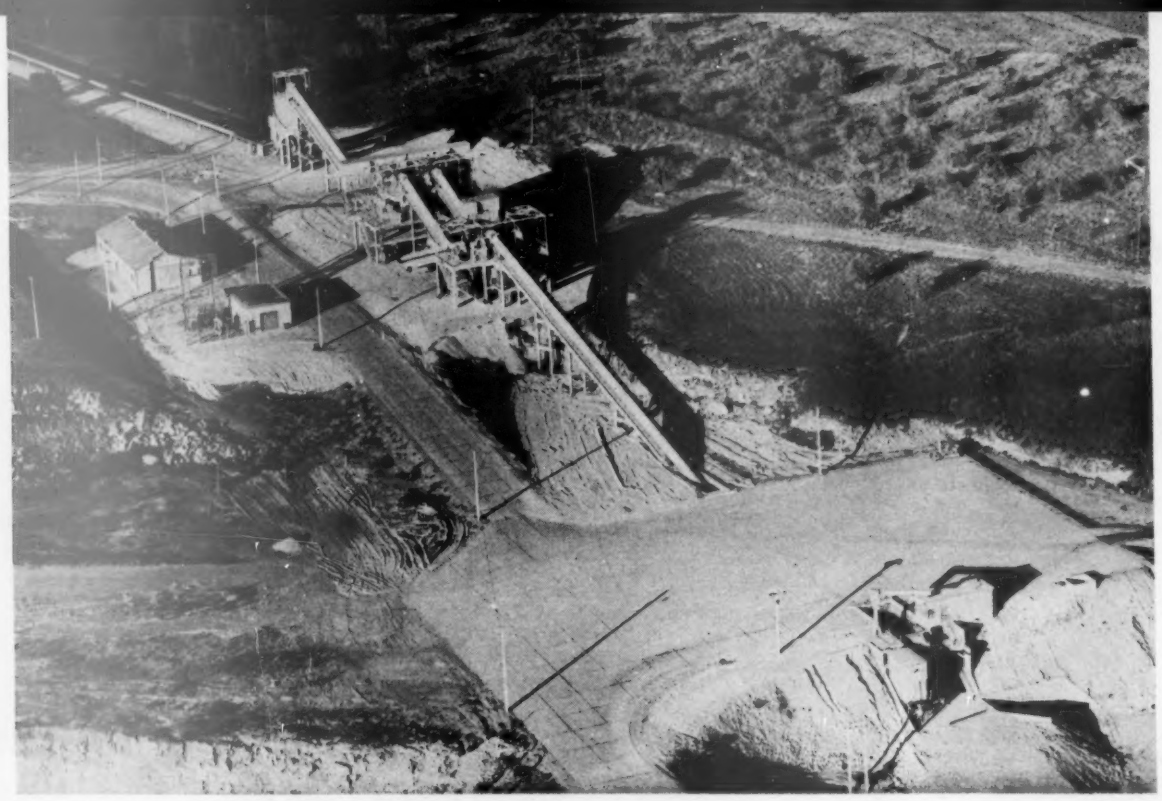


CONTROL is one of the primary and outstanding operational features. All phases of the operation except the primary crushing plant and the clay wash mills are regulated from this central console. Among the major phases controlled from this point is the entire length of the 5½-mile conveyor system.

UTILIZATION OF ITS OWN PRODUCT in graceful and attractive architectural expressions to house large, complicated manufacturing processes has become virtually a trademark of Ideal Cement Company. The modern structures in this overall view of the new Ada wet process plant include the kiln building, left; the mill building, right center; raw material and clinker silos, right; and the terminal section of the overland transport system.





THE NEW PRIMARY CRUSHING PLANT is an impressive installation in its own right. At the lower right is the primary crusher; at the center, the screening and secondary crushing stage and; at the upper left, the surge bin which feeds the first flight of the overland conveyor.

was expended on dust collection equipment.

The bulk loading installation is another primary feature at Ada. In addition to exceptionally high capacity, it incorporates three 140-ft. platform scales, the longest then built by the manufacturer.

All of these features make important contributions to an efficient operation that incorporates some of the largest, most modern processing equipment available.

This includes two Allis-Chalmers 12- by 450-ft. kilns; two 11- by 32-ft. raw mills; and two finish mills of identical size. All four Allis-Chalmers mills are driven by 2,000-hp. G-E motors. The two A-C clinker coolers are 6- by 100-ft. units.

Nine elevated cement storage silos built for bulk loading are 36 ft. in diameter, and 140 ft. high. With the four interstice bins, they can accommodate more than 200,000 bbl. of finished product. Their elevation above the loading stations contributes to the exceptionally high rate of straight gravity loading (up to 4,500 bbl./hr.).

Drives for all processing and handling components require nearly 550 motors. These range from 1/100 hp. to the 2,000-hp. units on the mills. In a 24-hour period these drives, plus the kilns' electrostatic precipitator, use approximately 230,000 kw. of electrical energy.

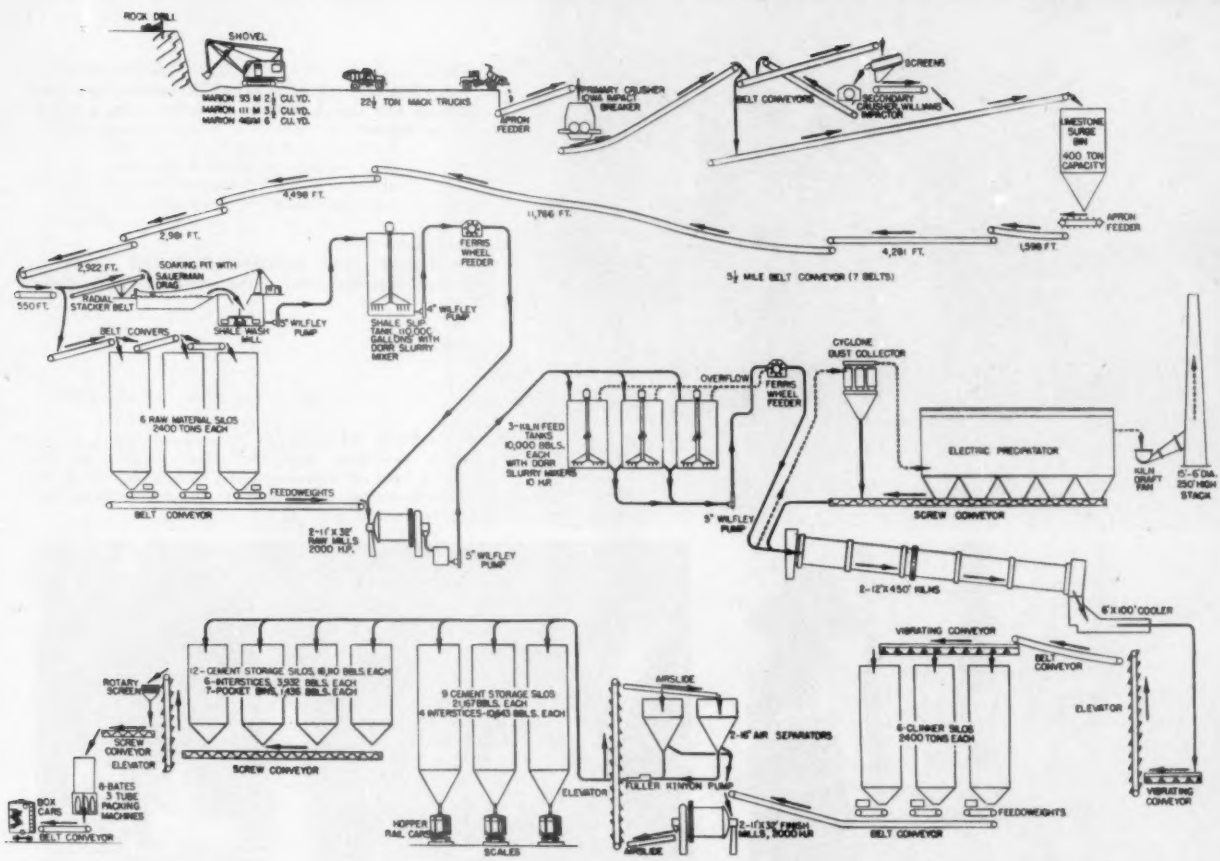
Construction The first phase of the expansion at Ada, the new plant known as No. 2, was started in August, 1956, and by the end of 1958, the first of two kilns was fired. (The second was put on the line in April, 1959.) In the meantime, the new crushing and screening plant was started in May, 1958 and completed a year later. In September, 1958, construction of the overland transport conveyor was initiated, and in August, 1959, it was completed.

General contractors on the site work and on the main plant, respectively, were the Concho Construction Company, and Fruin-Colnon Contracting Company. The quarry crushing plant was built by the Martin K. Eby Construction Company, and the 5½-mile transport conveyor system by Link-Belt Company.

The cement storage silos were erected by Fegles Construction Company, and general contracting for the office, laboratory, and wash house facilities was done by Charles T. Hughes Construction Co. The 250-ft. stack is a Custodis unit.

Overall basic design by Ideal engineers was detailed by Vern E. Alden of Chicago on the plant proper, and by Ken R. White of Denver on the crushing plant and silos.

Quarry Both limestone and shale are obtained from the Lawrence quarry, in different sections, but only the former requires blasting operations. Blastholes are sunk 40 ft. with an Ingersoll-Rand Drillmaster equipped with a 6-in. bit, and are placed on a 10-ft. spacing each way. An explosive charge of 200 lb.



A DIAGRAM OF MATERIAL FLOW from the new crushing operation at the quarry through plant No. 2.

is placed in each hole, and detonated by electric primer. The yield is about 8½ tons per ft. of hole.

Marion 6-cu. yd. electric shovels are used to load the rock and shale in their separate areas, and these materials are hauled to the primary crusher hopper in Mack trucks fitted with 22½-ton Heil bodies. They are dumped in the hopper separately, and at different times, and are transferred on a 60-in. by 25-ft. Pioneer Oro apron feeder to the primary breaker.

The crusher is a 5360H Cedarapids double impeller breaker driven by a pair of 200-hp. motors. Following reduction to 6-in. minus, the material is received on a 4-ft. wide belt for transport to a transfer point where the stone is split to a pair of screen feed belts. The shale however, bypasses this transfer, and is placed directly on a following conveyor for delivery to a surge bin.

Each of the two belt feed conveyors supplies a pair of 6- by 12-ft. vibrating screens with ¾-in. clear openings. Oversize is chuted to the 700-hp. Williams reversible impactor in each circuit, and the products of secondary reduction are placed on a return conveyor connecting with the screen belts in closed circuit.

The undersize from the screens is chuted to the conveyor which supplies the 400-ton surge bin. In normal practice, shale is processed one day a week, and crushed stone the other four. Thus the surge bin and following transport system are handling only one type of material at any one time. Material is transferred from surge to transport conveyor *via* apron feeder.

In addition to the Cedarapids and Williams equipment noted above, other major components of the crushing plant were supplied by Link-Belt (screens and conveyors), G-E and A-C (motors) and Norblo (collectors).

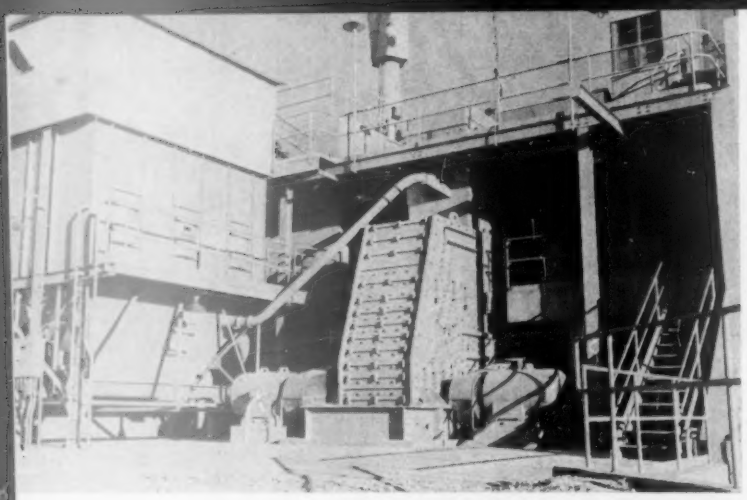
Transport The seven flights making up the overall length of the overland conveyor range from 11,766 ft. to 550 ft. in length. Each transfer point between flights is equipped with a dust collector.

Total connected horsepower in the system is 1,050 and is made up of seven motors ranging from 75 to 300 hp. The 36-in. belting installed totals more than 57,600 ft.

Conforming throughout most of its length to the topography of its route, the conveyor is mounted 4 ft. off the ground, except where it passes over three highways, two railroads, and a number of cattle passages. It travels at the rate of 500 f.p.m., and delivers 1,000 t.p.h. of raw material to the main plant.

Safety devices provided to protect the system include a belt piercing switch, metal detector, chute overflow switches, counter-weight take-up limit switches, belt slip switches, and belt drift switches.

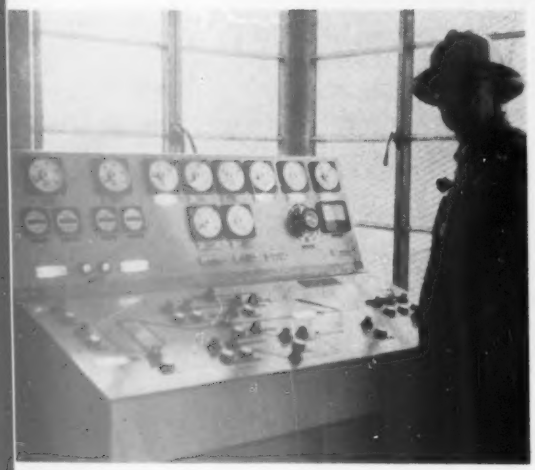
This unusual quarry-plant haulage installation was designed by Ideal and Link-Belt engineers. Primary components include the following: Allis-Chalmers motors, of range

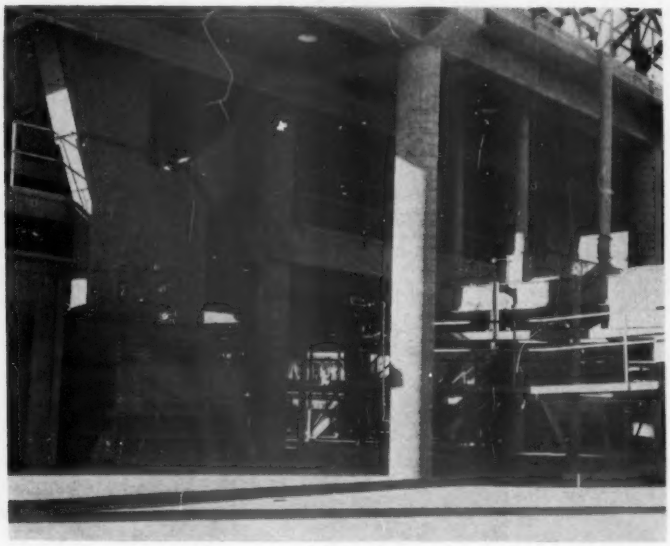


Left:
THE PRIMARY IMPACT BREAKER reduces quarry-run material to a top size of 6 in. It is driven by a pair of 200-hp. motors.

Below, left:
CRUSHING AND SCREENING PLANT control is handled from this panel at the primary crusher installation.

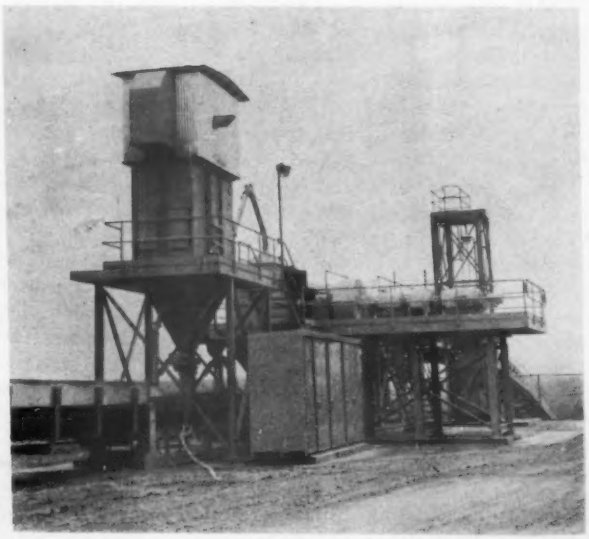
Below:
SECONDARY REDUCTION is accomplished with two 700-hp. reversible impactors. Final products of this crushing, and of screening, have a top size of ¾ in. (Shale by-passes all steps after primary crushing and is transferred directly to the surge bin.)





Right:
A TRANSFER POINT between two of the seven flights in the overland conveyor. All such points are equipped with dust collectors of the type seen here.

Below:
AN OVERPASS in the 5½-mile route of the overland belt conveyor. With the exception of such crossings, the system conforms to the topography of the route. The conveyor travels at 500 f.p.m., and delivers material to the plant at the rate of 1,000 t.p.h.



THE TERMINAL SECTION, right, of the conveyor system, which can be seen stretching sinuously into the distance. In the middle background is a transfer point at which shale, when in transport, is delivered to the wash mill soaking pit stacker. The bucket elevator, foreground, raises additive components to a belt paralleling the stone conveyor.

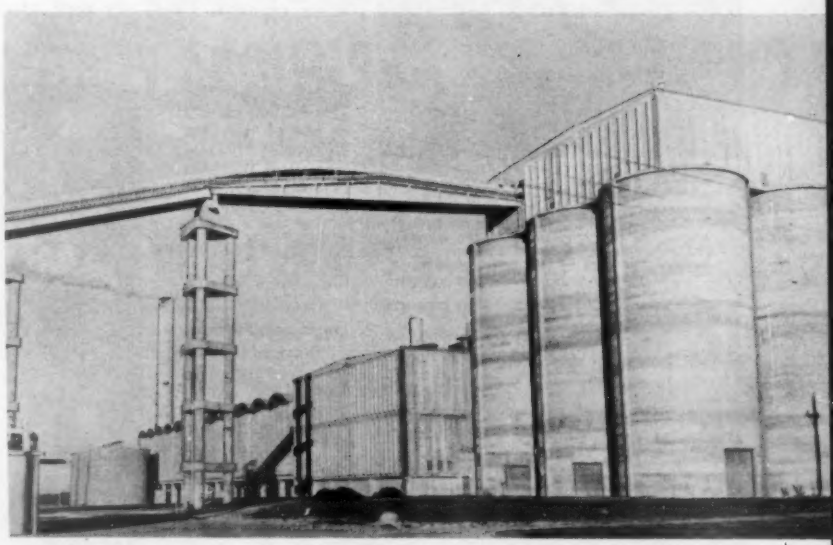
noted above, which are open-type, have a 15 percent service factor, and are provided with Dynamatic eddy-current clutches; the 11 miles of Goodrich belting (this includes a 12,000-ft. section described as the longest single flight ever engineered); Simplex electrical cable; and the Norblo 80AM 2-compartment collectors for the transfer points.

Raw Storage On arriving at the main plant site, the transport conveyor discharges at a transfer point to either of two following conveying systems. In one, when shale is in transit, this material is received on a radial stacker which discharges at one end of the clay wash mill soaking pit. The other, handling stone, inclines upward to the top of the limestone storage silos adjoining the mill building.

The soaking pit has a capacity of more than 21,000 tons of shale, which is spread and reclaimed by a 2- cu. yd. Sauerman drag scraper to the four wash mills. Slip from the latter is pumped to a 2,940 bbl. tank in the raw mill building.

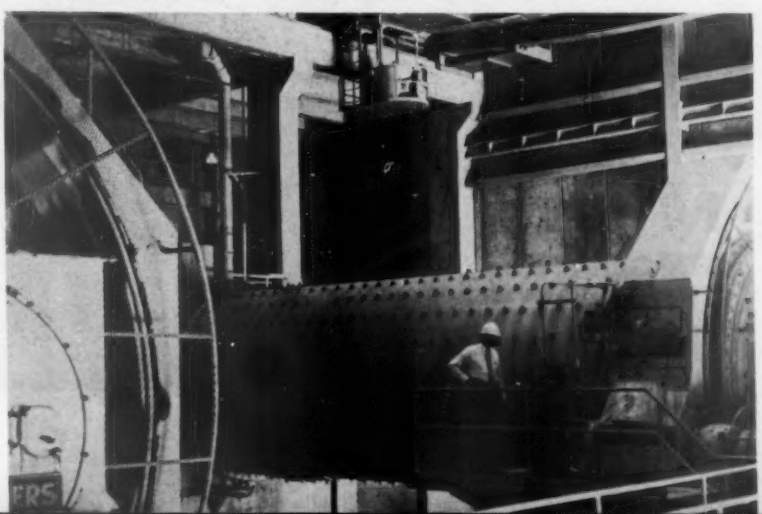
If desired, rock and shale can be stored on outside stockpiles near the wash mill area, and then trucked to a reclaim hopper which is connected by belt conveyor to the transfer point noted above. All conveyors in the flow after this transfer station are Hewitt-Robins equipment, and are fitted with 42-in. belting.

At the top of the dry raw material silos, the limestone is distributed into the silos (each having a capacity of 2,722 tons) on one conveyor system, while from a parallel system, sand, iron ore, and gypsum are discharged into appropriate interstice storage. The latter materials are received by rail or truck, and are raised from a receiving hopper *via* Chain Belt bucket elevator to the distributing conveyor. (*Turn Page*)



COMBINED UTILITY AND ARCHITECTURAL ATTRACTIVENESS is further evident in the prestressed concrete beams and supporting columns of the conveyor; in the louvered precast vertical panels of the kiln building (left); in the external stiffener wall panels of the mill building, center, and above the silos; and in the barrel roof sections covering the kilns.

ONE OF THE TWO RAW MILLS. The latter and the two finish-grind mills are identical 11- by 32-ft. units, and all are driven by 2,000-hp. motors.



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IF your plant is operating around the clock (7 days per week, 24 hours per day), and —

IF bag stacking is a part of that operation —

the **MILLER AUTOMATIC PALLETIZER** *is almost certain to save you money.* This completely automatic, operatorless unit is specifically engineered to slash production costs in two- and three-shift plants.

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While you're thinking about it, write for bulletin describing operation of the Miller Automatic Palletizer in detail!

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Milling Raw material feed (dry) for the mills is initiated on 30-in. Feedoweights below the stone silos, and 24-in. units below the interstice bins. These deliver to the 24-in. conveyors that furnish direct feed to the two raw mills. Shale slip is delivered from the storage tank, at 68 percent solids, by one of the Wilfley pumps used throughout the plant for slurry handling.

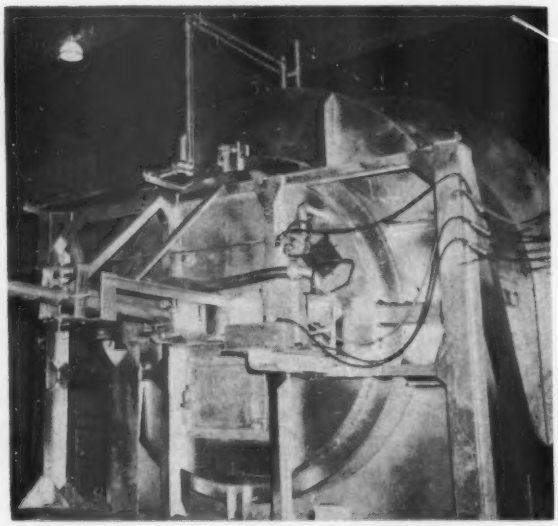
The raw mills are 2-compartment Allis-Chalmers units, operated at 18 r.p.m., and charged to 40 percent of volume with 286,000 lb. of 1- to 3-in. grinding balls. Capacity is about 6,000 bbl. of slurry every 24 hours, from each mill.

Every hour, samples of raw mill discharge are checked for CaO and water content. Twice per shift, samples are checked for fineness of grind, which is held at 84 percent or better passing the 200-mesh sieve. Slurry density is controlled by an Ohmart radioactivity meter on the raw mill discharge line. Slurry is pumped to a group of three correction, blending, and feed tanks that have individual capacities to 10,350 bbl. of clinker.

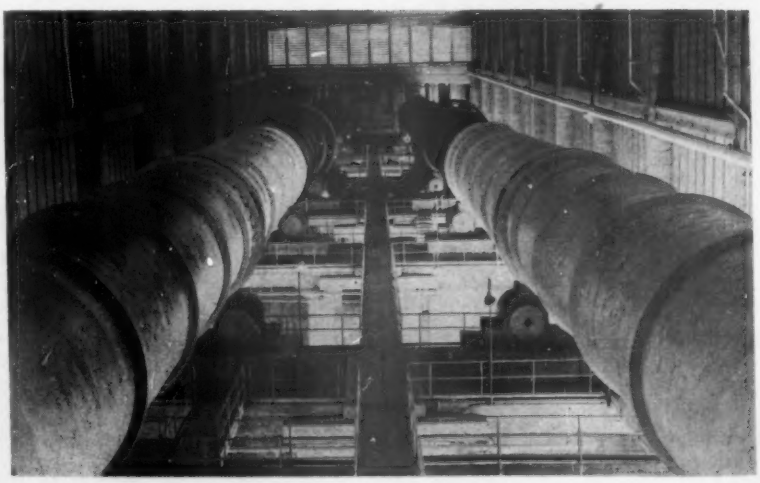
The two finish mills are identical to the raw units, which they adjoin, and are operated at the same r.p.m. However, they are charged with 282,000 lb. of 1- to 2-in. grinding media. They are fed by a system similar to that of the raw-grind circuit, from a group of six clinker silos. (The latter are part of a group that includes the stone silos.)

Due to the size of the finish mills

Right:
THE FIRING HOOD of one of the kilns. Controlling instrumentation includes TV monitoring of the firing conditions.



Below:
A VIEW OF THE TWO KILNS in plant No. 2, looking toward the firing end. These two gas-fired units are 12 ft. in diameter and 450 ft. long.



each one is operated in closed circuit with two 16-ft. Sturtevant separators. Each circuit is closed by a 16-in. Airslide, and a Chain Belt bucket elevator from mill to separator. Both circuits incorporate a 60-ft. Norblo bag-type dust collector.

Each finish mill is rated at about 6,600 bbl./day; and hourly checks are made on fineness, which is maintained at 2,800 to 3,200 Blaine. Sulphate tests are made simultaneously. Finished cement from the separators is delivered to either of two 9-in. Fuller-Kinyon pumps for transfer to the packing and loading installations (described later).

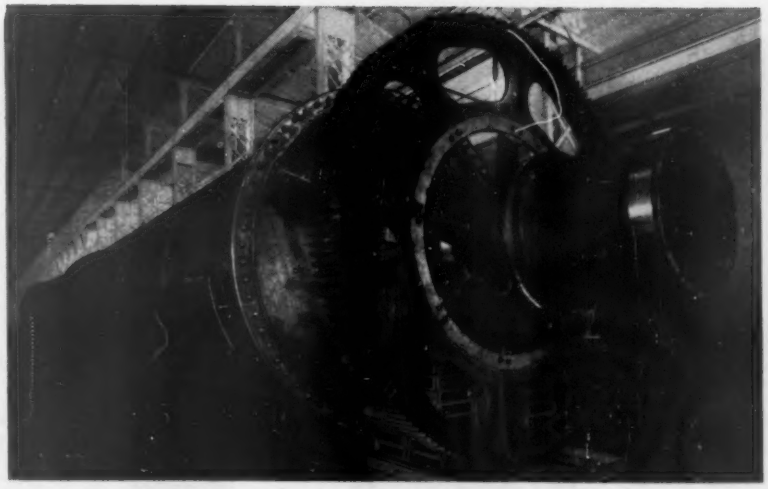
Kilns Feed for the kilns is retained in the slurry tanks from 24 to 48 hours for correction, aeration, and agitation. The tanks are filled to a level 5 ft. below the top to permit correction. Every shift, a sample is taken for determination of CoO, fineness, and water content. From any of the three tanks, slurry is pumped to the ferris wheel feeders for the kilns.

Each of the latter is equipped with a 70-ft. long spiral chain system starting 11 ft. from the feed end. Each is supported on six sets of trunnions, and operated at 80 r.p.h., with drive provided by a pair of 100-hp. d.c. motors.

The fuel used is natural gas. Fuel efficiency has been quite favorable—averaging slightly more than 1,000,000 B.t.u./bbl.—with a normal burning temperature of 2,800 deg. F. At standard production of 4,500 bbl./kiln/day, each kiln uses about 5,000,000 cu. ft. of gas.

Induced kiln draft is provided by a 300-hp., 180,000 c.f.m. fan. Preheated primary combustion air is taken from the clinker cooler, which has a 150-hp., 150,000 c.f.m. unit. These and the 150,000 c.f.m. cooler excess air fan which follows the cooler dust collector are American Blower equipment.

Kiln gases first pass through a Buell cyclone collector and then through a Buell electrostatic precipitator before entering the stack. Together, these units have recorded over 99 percent efficiency. About 75 percent of the dust is removed in the cyclone section, and all dust removed by the system is returned by screw conveyor and Chain Belt ele-



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ROTARY COOLERS IN FOUR TYPES

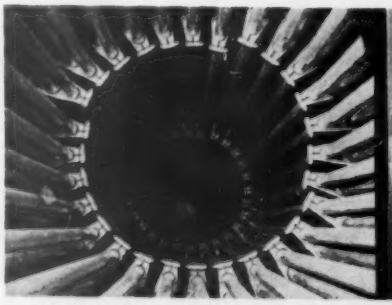
GAS-COOLED TYPE—Solids are cooled by direct contact with cooling air (atmospheric, or dried and refrigerated). Inert gases may be used in a closed system.

WATER-COOLED SHELL—Water is externally applied to the shell, either by sprays or by partially submerging the shell.

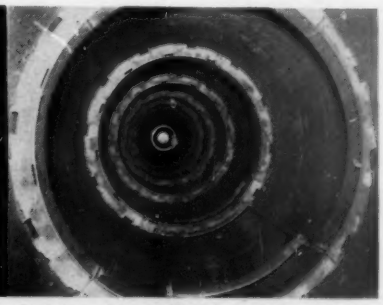
TUBULAR TYPE—Internal water-cooling tubes are assembled with the rotating shell, or installed as a stationary bank of tubes concentric with the shell. Alternately, the water leaving either of these tube sections may be used for supplemental spray cooling on the shell exterior.

DIRECT-CONTACT WATER—For rapid cooling from very high temperatures, water is sprayed directly on the hot material to utilize the latent heat of vaporization. Usually supplemented by secondary air cooling.

Each of these types has a particular area in which it is most economically applied. Write for further information.



Interior of a water-tube cooler. Longitudinal banks of tubes provide maximum cooling surface for minimum floor space.



Interior of partially-submerged cooler with gravity-controlled scrapers maintaining clean shell surface for high-rate heat transfer.

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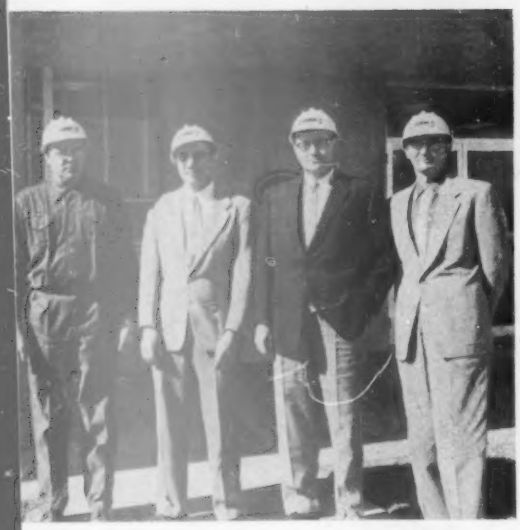
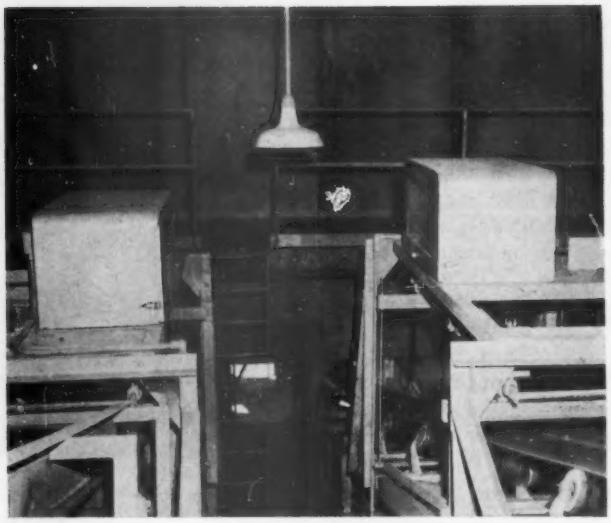




Above, left:
STAFF. Dave Howe, second from right, has been plant manager at Ada since 1954. Members of his staff include Bob Reese, plant engineer; John Relic, assistant plant manager; and Carmon Hargis, chief chemist.

Above, right:
CLINKER PRODUCTION is continuously and automatically recorded by these units installed with the distributing belts above the clinker silos.

Below:
KILN GASES are drawn through a cyclone collector group and an electrostatic precipitator before entering the stack. Together, these units have recorded more than 99 percent efficiency.

vator to a dust bin. From this point the material is delivered in desired amounts to vortex mixers through which slurry from the ferris wheel feeders passes before entering the kiln feed pipes.

Back-end temperatures average 620 deg., and this has been dropped to less than 500 deg. in the gases reaching the i.d. fan. Clinker discharged from the kilns has a temperature of about 2,000 deg., which is reduced to about 150 deg. during the approximately 12-minute retention time in the coolers.

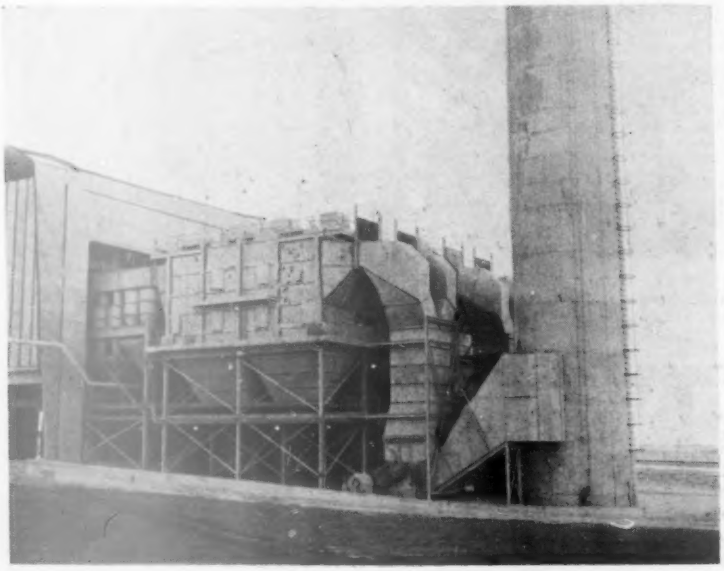
Control As indicated earlier, the operation of virtually all equipment in the plant is controlled by a single operator stationed in a central control room in the kiln building. The exceptions are the wash mill installation and the quarry crushing booth.

However, the balance of the operation, from the overland conveyor to the finished product distribution, is regulated from the central consoles. In addition to instrumented control of the kilns and auxiliaries, the operator utilizes Diamond Utiliscope TV equipment to monitor kiln firing conditions.

Clinker In transfer from the coolers, clinker is transported on 18-in. Carrier natural-frequency conveyors to Chain Belt elevators, in which it is raised to discharge on a belt conveyor system for distribution in the clinker silos. The six in this group—a part of the battery of 12 for stone and clinker storage—have individual capacities of 18,400 bbl.

Feed for the finish mills is drawn from these silos *via* 24-in. Feedoweights in a system described under "Milling." Clinker samples are taken hourly and made into a composite shift sample. Clinker production is continuously and automatically recorded by Transportometers installed on the clinker distributing belts.

(*Continued on page* 163)



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And the same factors that reduce noise, vibration and throw also are responsible for better breakage and lower costs.

Your Atlas Representative, backed by the complete Atlas line (including all types of ammonium nitrate), can help you select the best combination of explosives or blasting agents and the right blasting techniques to give you maximum control on every shot. And remember, blasting control means greater profits.

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ROCKMASTER® electric blasting caps achieve the staggered action which is so important in producing better breakage and control.

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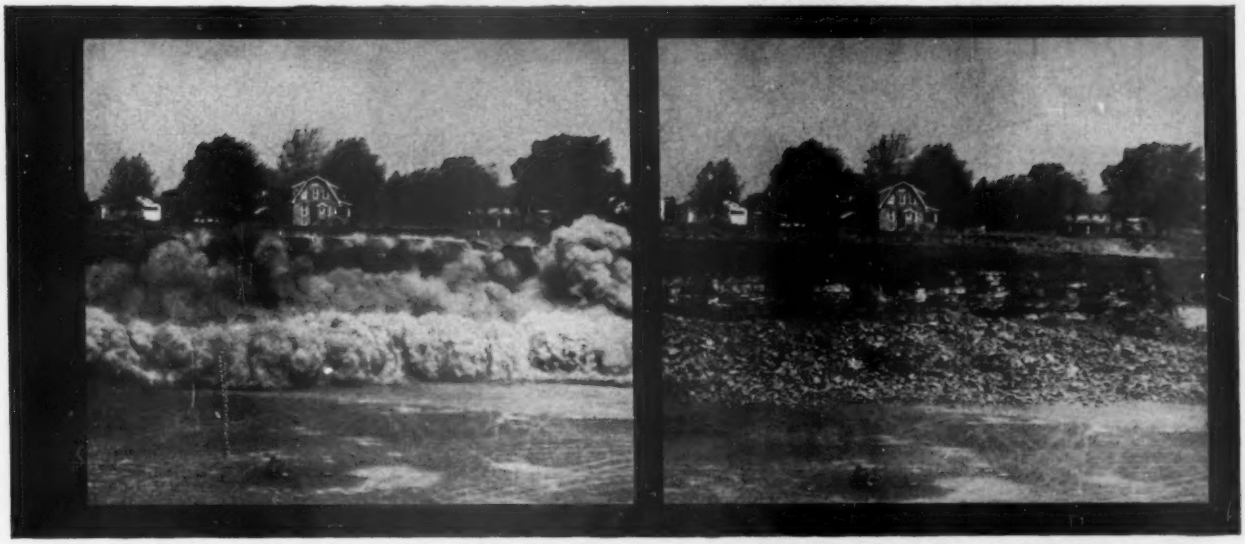
EXPLOSIVE?



1⅛ SEC. — Solid explosives action without excessive noise, vibration, or flying rock.

AFTER—There is plenty of easy digging in this pile. Explosive was Amocore.®

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GIANT "75" PRIMERS have the wallop for complete, efficient detonation of both field mixed and plant mixed blasting agents.

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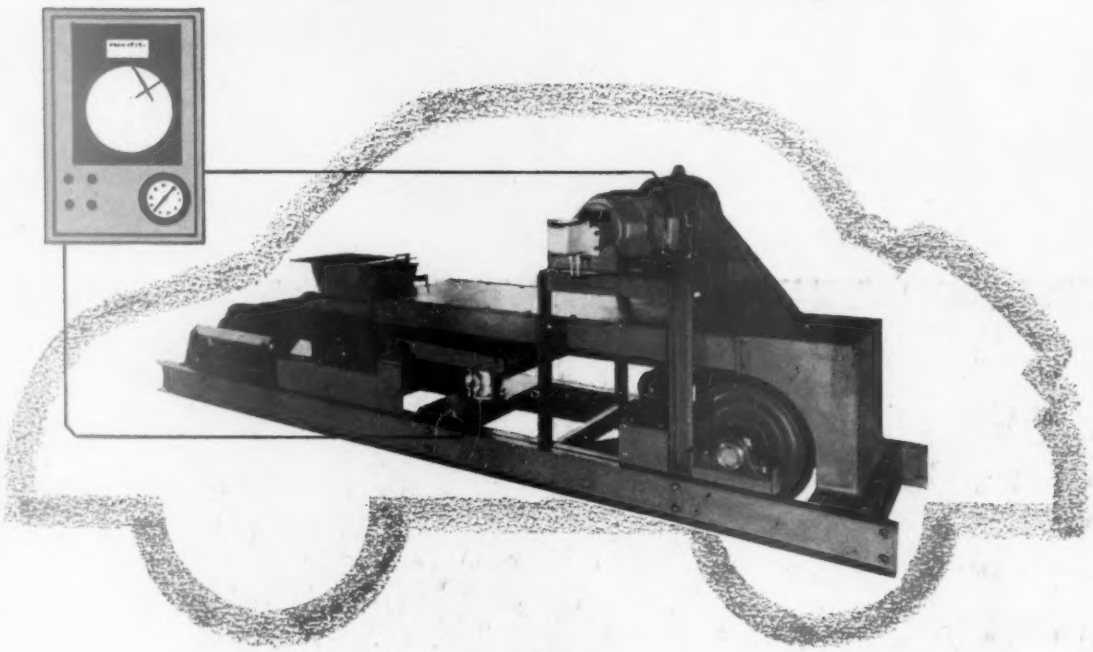

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Con-O-Weigh now offers a self contained package – ready to install – that weighs, conveys, controls your product and records the data essential to accurate control and uniform production. The Con-O-Weigh unit comes in a complete range of sizes and is designed to go on practically any aggregate, cement or ore production line – with minimum installation involved. For example, the 30″ machine requires only 2′6″ headroom. Just set in place – connect instruments – and you're ready to roll.

Constant or variable speed with pneumatic or electronic controls . . . adjustable gate opening . . . exclusive quick-change feature that allows a belt to be replaced in as little as 30 minutes . . . starvation switch to warn of bin hang-up . . . heavy duty roller bearings – these are some of the deluxe features engineered into this compact weight feeder. Ideally adaptable to proportioning two or more products.

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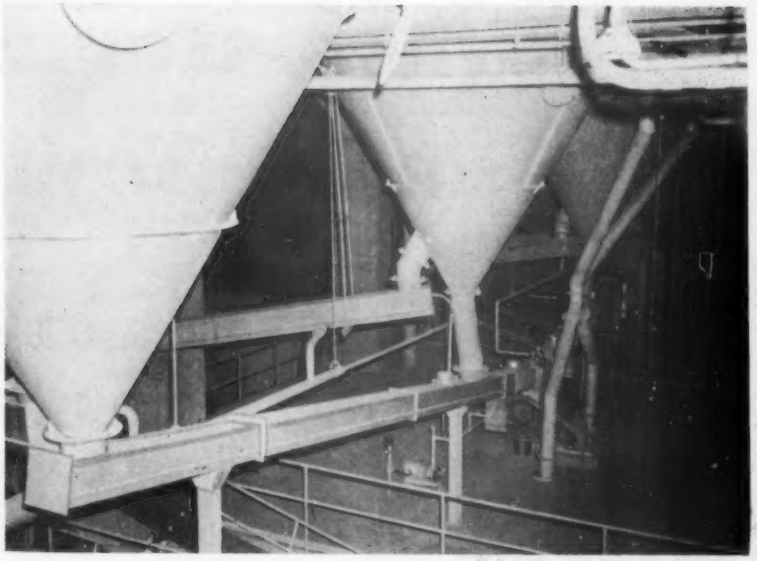


Left:
EACH FINISH MILLING CIRCUIT incorporates two 16-ft. separators, due to the size of the mills.

Below:
THE NINE NEW CEMENT STORAGE SILOS. Below each row of three is a 150-ton, 140-ft. long platform scale. Elevation of the silos above the scales permits extremely fast, full-gravity flow loading.

Cement Plant a Primer

(*Continued from page* 158)

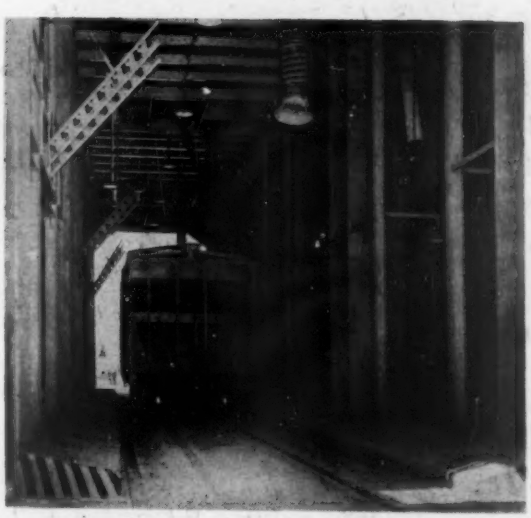
Product Storage, Loading The nine new cement silos built during the construction of plant No. 2 have a total capacity, with interstice bins, of 200,000 bbl. Beneath each row of three silos in this group is a 150-ton capacity Fairbanks-Morse platform scale. Each six-section scale supports a 10- by 140-ft. platform—the largest then built by F-M. They are constructed so that either rail hopper cars or trucks may be loaded, and three units can be weighed simultaneously, one on each deck.

For weighing rail cars, a 300,000-lb. type registering beam is used. Truck weighing utilizes dual weight control with a 100,000-lb. capacity dial and a Printomatic unit, in addition to the beam.

An important improvement incorporated in the new loading installation is an automatic weight control. This involves a cut-off, designed by Ideal's engineers, comprised of a photo-electric unit, a mercury switch at the end of the load beam, a solenoid, and an air-cylinder-operated rotary plug valve.

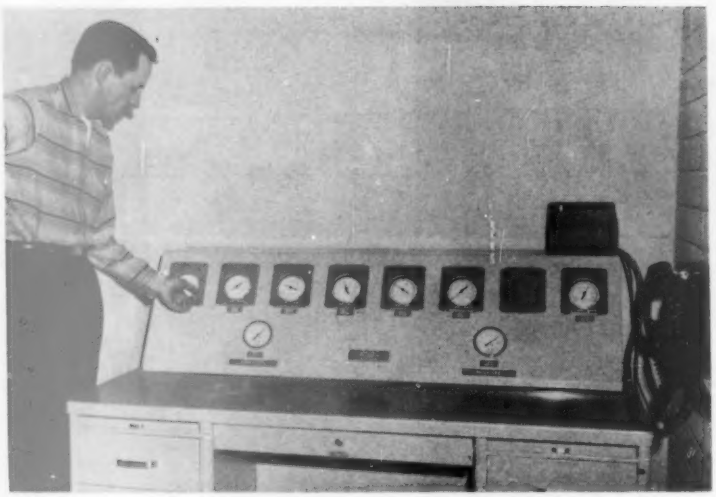
Following the setting by the weighmaster of tonnage to be delivered into a carrier, the gravity flow of material through the valve and

(*Continued on page* 173)



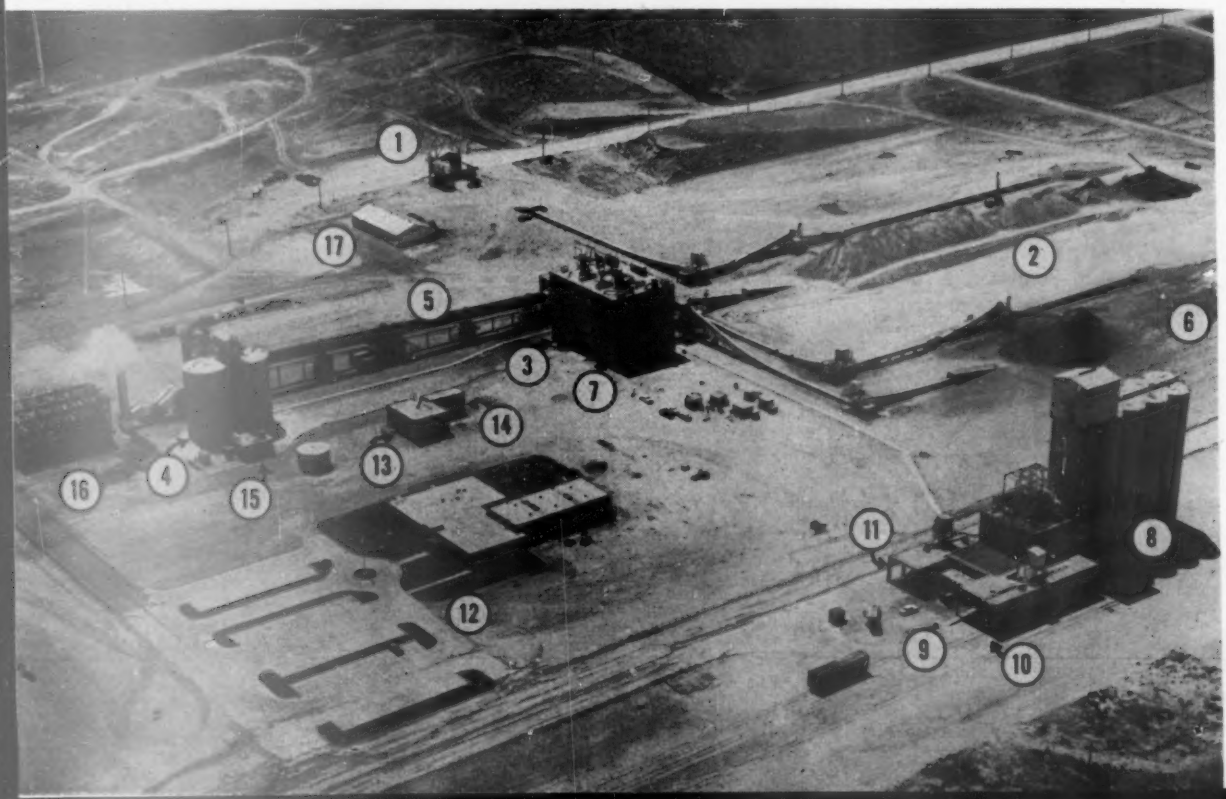
Right:
EACH OF THE THREE SCALES below the storage silos will accommodate either rail cars or trucks. Three units, one on each scale, can be weighed simultaneously.

Southwestern with New



A REMOTE-CONTROLLING CHEMIST'S PANEL in the laboratory is an important factor in the round-the-clock quality control program. In normal operations, and based upon mill feed and discharge analyses, reclaiming tunnel feeders are regulated from this panel to deliver correct mill feed proportions at desired rates to a constant-weight-controlled mill feed conveyor.

THIS AERIAL VIEW of Southwestern's new Odessa, Tex., operation clearly shows the ample room provided for ready expansion of the individual phases in the future without disruption of existing facilities. The following designations are keyed to the numbers on the photograph: 1—crushing department; 2—raw material storage; 3—raw mill; 4—blending silos; 5—kiln department; 6—clinker storage; 7—finish mill; 8—storage silos; 9—packing area; 10—rail scale; 11—truck scale; 12—office and laboratory; 13—water treatment; 14—admix building; 15—compressor house; 16—kiln gas baghouse; 17—quarry equipment building.



Boosts Capacity Texas Plant

• Extensive quality control teamed with modern simplified machinery systems, detailed functional instrumentation in progressive cement plant design

THE FIRST plant of the Southwestern Portland Cement Company started serving the west Texas and New Mexico areas in 1910. Approximately 50 years later, the new 1,250,000-bbl. Odessa, Tex., plant of the company was placed in operation, serving the same area.

The basic design concepts of the plant feature the modern theme of simplified machinery systems, with detailed functional instrumentation and extensive quality control features.

Another criterion for design was that of easy expansion. All processes, from quarrying through loading facilities, are physically laid out so that expansion can be carried out without interruption to existing production facilities.

Specifically, the physical layout is such that each department has more than ample room for expansion—and each in a separate direction, with no interference to the present flow.

By BUREN C. HEROD

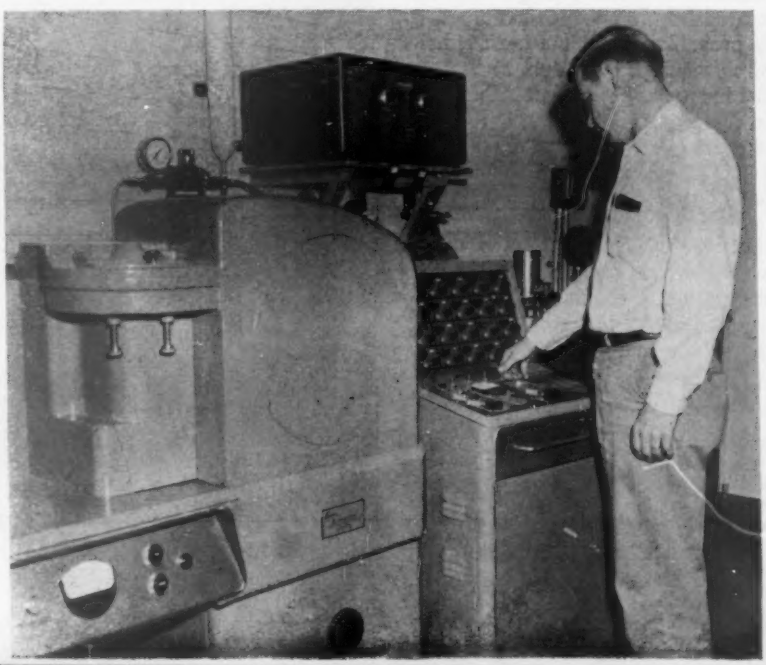
Construction The contractor moved onto the site in August, 1958. Clearing of the site and excavation started in September. Approximately the first of May the following spring the plant went into operation; and just prior to June, 1959, the first cement shipments were made.

All major buildings are of one form or another of concrete construction, and employ the same architectural motif throughout the plant.

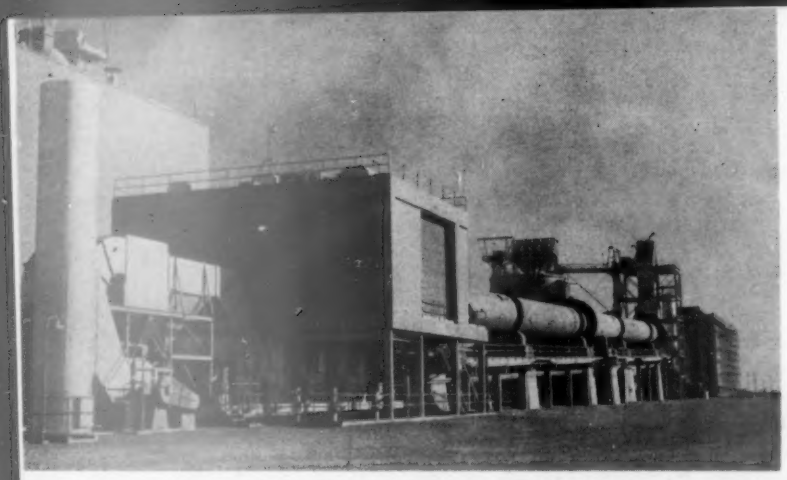
The early completion of the construction of this plant was greatly enhanced by favorable weather, outstanding contractor performance, and excellent equipment delivery.

Features There are many interesting operating features employed in this plant. For example, the primary crusher, an impactor, handles the only reduction stage through which quarried materials are processed. This is a single-pass operation; there are no screens anywhere in the flow.

Raw materials are stored in outside lineal stockpiles above the re-



Right:
THIS AUTOMATIC X-RAY SPECTOGRAPH plays a significant role in the quality control program. It has sharply reduced the elapsed time between preparation of a test sample and final analysis.



THE KILN is an 11½- by 400-ft. gas-fired unit. Its exhaust is filtered through 1,728 glass cloth bags installed in the structure at the far end. At the left is the 50-ft. grate-type cooler below the kiln firing and control room.

claiming tunnel; and the conveyor housed in the latter delivers directly to the raw mill feed belt, *i.e.*, there are no mill feed bins—surge is provided entirely in the stockpiles. An identical system, except for the number of conveyors involved, is used for clinker. Crusher-run material and clinker are placed on their respective piles by rail-mounted stackers.

The mill building, housing both raw- and finish-grinding units, is built in the shape of a "U." This permits the operation of a truck-mounted crane inside the "U" for ease of maintenance and servicing of any component, high or low, in either of the two milling circuits.

Despite the fact that the plant is situated in open country, well removed from any congested areas, it is probably one of the most extensively equipped for dust control in the industry. The most obvious unit in this system, naturally, is that incorporating 1,728 glass cloth bags (12 in. in diameter and 25 ft. long) for filtering the kiln exhaust.

Transfer points in the raw material and clinker-handling systems, as well as the primary crusher installation, are all fitted with dacron bag filters. All of these are in addition to other company-designed dust control equipment in the milling and packhouse departments.

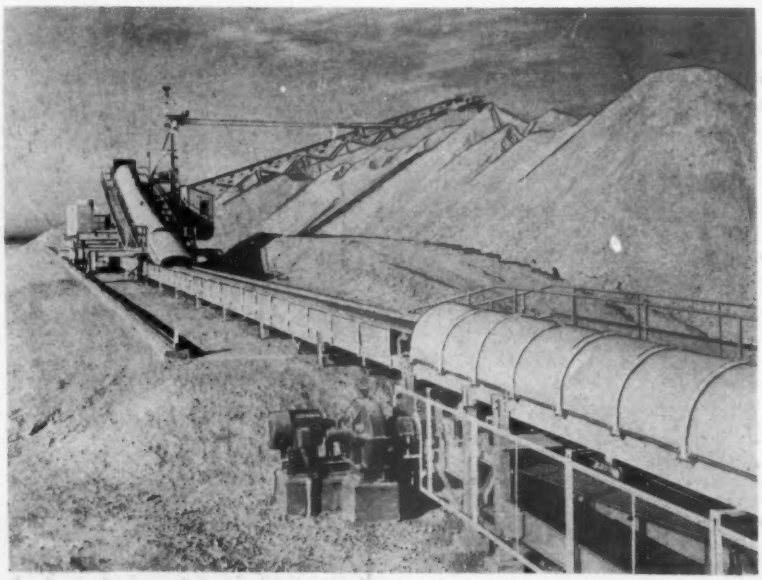
Control Appropriately, the efficiency of operating design is paralleled by that of round-the-clock quality control. An automatic X-ray spectograph and remote controlling chemist's panels are employed in material analysis, proportioning, and flow regulation.

The program involves hourly acid-alkali titration of carbonate content in raw mill discharge samples obtained by an automatic sampler. Hourly control of calcium, iron, and alumina components in the raw mix is facilitated by the X-ray spectograph. Fineness of the raw mill product is held between 83 and 86 percent minus 200-mesh through checks made every eight hours, accompanied by appropriate adjustments to the separator and feed. Adjustments for raw mix holding points are obtained from the daily clinker analysis.

The latter is run daily on a 24-hour composite sample. Additional control is based on determination of the uncombined CaO in composite clinker samples every four hours, or more frequently, if necessary. Every two hours finish mill samples are checked for surface area and sulphate content, and any necessary adjustment to mill feed proportions or separator settings is made. Consistent clinker blending is maintained by determining the uncombined CaO in the cement every four hours.

Rounding out this comprehensive control procedure are daily physical checks on a composite sample of each day's shipments, plus chemical and physical tests of composite samples of weekly shipments.

Raw Materials At Odessa these include limestone, shaley limestone, and caliche (all obtained from the quarry), and slag. The former three occur as various strata of the Edwards formation in which the quarry was opened. From core drilling, this formation was



RAW MATERIAL AND CLINKER STOCKPILING SYSTEMS are among the features of the operation. Seen here is the raw material phase. An identical and parallel system handles clinker (see also aerial view).

QUARRY OPERATIONS provide limestone, shaley limestone, and caliche. The loading seen here is on the upper of two benches.

found to have quality material to a depth of more than 100 ft., and its favorable character improved with depth.

Quarry Blastholes are sunk by a large rotary drill fitted with a 4¼-in. bit. The holes are spaced on a 9- by 12-ft. pattern, and are drilled on two ledges from which stone of particular analysis is obtained. Ammonium nitrate is the primary blasting agent, with 60 percent gel placed in the bottom of the hole. Yield averages nearly two tons of stone per lb. of explosives.

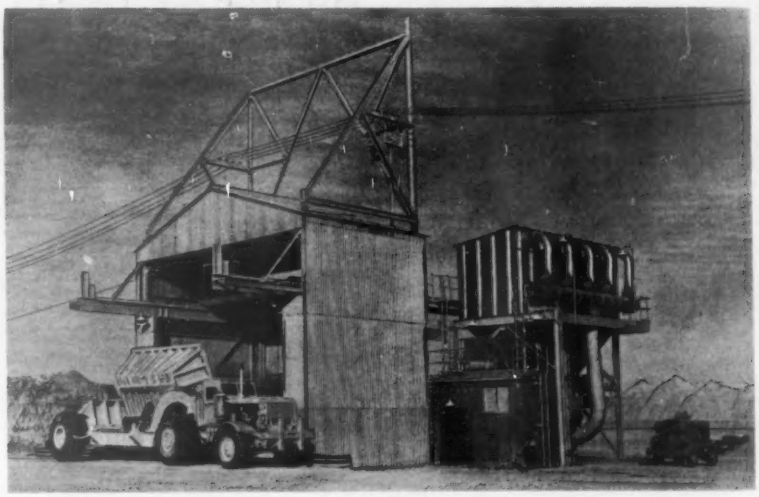
Loading from the upper face is handled with a 4-cu. yd. shovel, and from the lower face by a 3½-cu. yd. machine. The quarry-run material is hauled to the plant in a pair of tractor-trailer units with 40-ton side-dump bodies.

As dumped at the primary crusher installation, the stone is transferred on a 60-in. by 23-ft. apron feeder to a 600-hp. primary crusher. Each of the 15 hammers in this breaker weighs 470 lb. It produces about 450 t.p.h. of material with a top size averaging 1½ in.

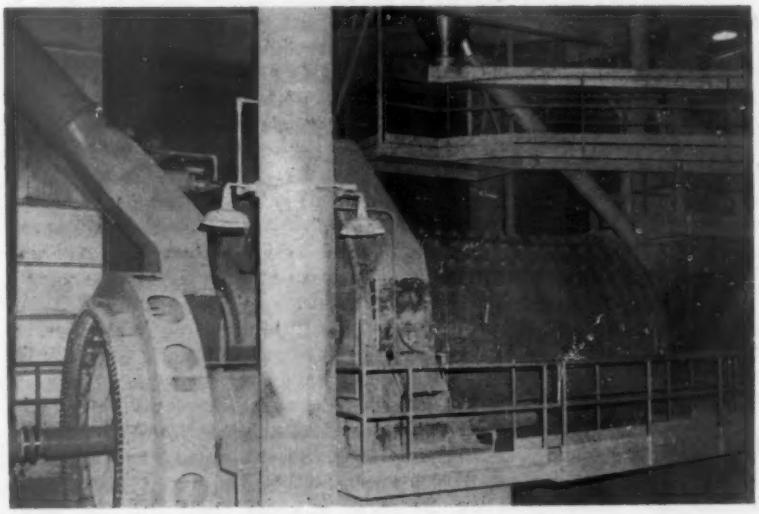
Crusher product is discharged onto the 36-in. wide belt of a conveyor housed in an underlying inclined concrete tunnel. The material is weighed in transit—one-shift operation averaging 2,000 to 2,200 tons.

Stockpile System At a transfer point on the surface the tunnel conveyor discharges to the belt supplying an 85-ft. stacker. The latter travels on rails 426 ft. long, and its 30-in. belt discharges onto the appropriate pile above a 600-ft. reclaiming tunnel. Approximately 60,000 tons of material to supply the raw mill are maintained in this storage.

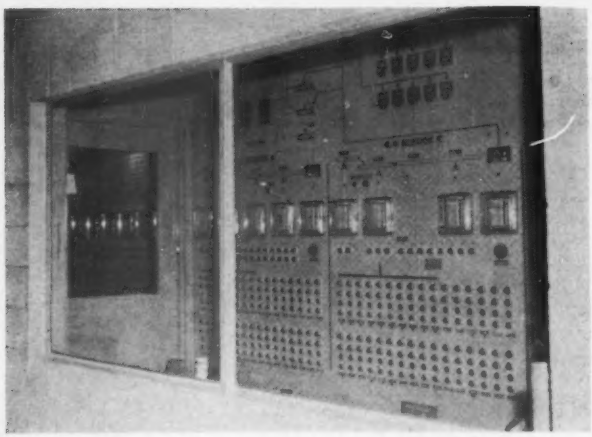
(Turn page)



PRIMARY CRUSHING is a single-pass operation. Quarry-run material discharged from side-dump haulage units is reduced by a 100-hp. impactor to a top size averaging 1½ in., at the rate of 450 t.p.h.



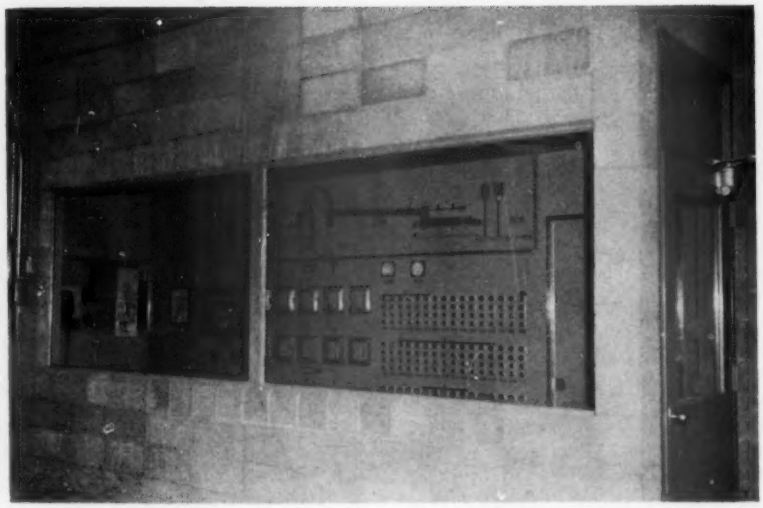
RAW MILLING is handled by this 11½- by 17-ft. ball mill, which is driven by a 1,250-hp. motor. An identical unit is used for finish grinding. Both are fed directly from appropriate stockpiles, which also represent surge capacity.



Top, left:
THE MILL BUILDING has an internal arrangement in the form of a "U," which permits operation of a truck-mounted crane inside the structure. This facilitates servicing of any component, high or low, in either milling circuit.

Top, right:
MILLING CONTROL is provided on this panel in the mill building. A chemist's panel similar to that in the lab is also available. In normal operations the mill supervisor may vary the feed rate without changing proportions. However, he may also adjust the latter in case of abnormal conditions.

Right:
THE KILN CONTROL ROOM is housed in a dust-free enclosure on the firing floor.



An identical handling system is provided for clinker. However, the stacker rails are 228 ft. long, and about 20,000 tons of clinker can be placed over the reclaiming tunnel.

In both installations the stacker rails are laid out so that the stacker can be placed on either side to create parallel piles. Each reclaiming tunnel houses a battery of vibrating feeds to supply its 30-in. wide belt. The raw material conveyor connects directly with the raw mill feeder, as noted previously. While clinker is also transferred directly from stockpile to the finish mill feeder, the system involves two more conveyors. The latter also accommodates gypsum and other product components.

Milling Two identical 11-ft. 6-in. by 17-ft. mills are housed in the mill building. They are driven by 1250-hp. synchronous motors. The ball charge weight is the same for each—185,000 lb., and consists of 1¼- to 4-in. media in the raw mill, and 1- to 4-in. balls in the finish mill.

Both mills operate in closed circuit with 18-ft. separators *via* bucket elevator. In the raw circuit, the separator is equipped with a pair of 3,500,000 B.t.u. heaters. Auxiliary heaters are also provided for the raw milling circuit elevator. Each circuit includes two bag-type dust collectors designed by company engineers. A 12,000 c.f.m. unit collects from mill discharge, and a 56,000 c.f.m. collector handles mill feed and the separator.

In normal operations the raw mill delivers about 75 t.p.h. of kiln feed material. A steady and correctly proportioned flow of raw materials to this mill, and also the finish grinding unit, is initiated on the vibrating feeders in the stone stockpile reclaiming tunnel.

At this point the chemist's panels are brought into play for remote control of mill feed. One panel is installed in the laboratory and another in the mill operator's control room. In normal operations the laboratory panel is used for control, and based on mill feed and discharge analyses, the feeders are regulated from this panel to deliver the correct proportions at desired rates to a constant-weight-controlled conveyor.

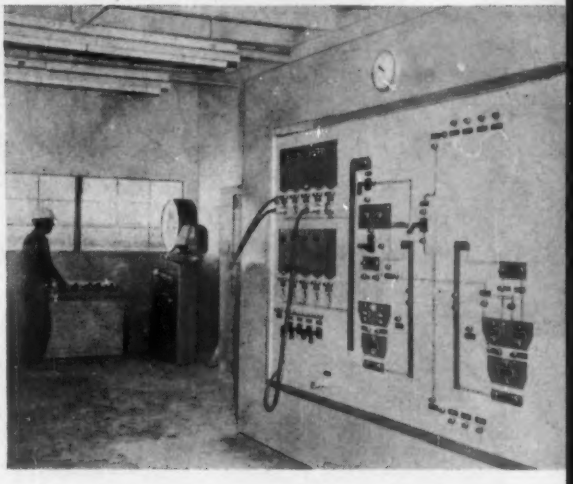
The normal operation of the mills provides for the mill supervisor varying the feed rate of the mill without changes to the raw material proportions. However, the mill supervisor can vary the proportion rate in case of abnormal conditions.

An identical additional mill and

Left:
THE STACKER SYSTEMS are installed in such a way that each stacker may be placed on either side of its rail to create parallel lineal stockpiles. In the foreground of this view is the clinker distributing stacker.

Below, left:
FINISHED PRODUCT STORAGE SILOS have individual capacities of nearly 15,000 bbl. There are ten silos in two groups of five immediately adjoining the packhouse.

Below, right:
LOADING AND PACKHOUSE OPERATIONS are supplied through distribution systems regulated from this control panel. At the left, an employee is standing by the truck bulk-loading scale instrument.



mill building are under construction now.

Kiln Feed Raw ground material is transferred *via* 12-in. Airslide from the separator to a 9-in. pump with which it is transferred through a 10-in. line above ground to one of a pair of blending silos. These are equipped with quadrant aeration blending systems, and each silo has a 4,500-bbl. live storage. Following any necessary blending or correction, one silo provides kiln feed as the other receives raw mill discharge.

Kiln feed is transferred to a constant level "bubble" tank. It is drawn from the latter to a 24-in. screw conveyor and delivered to a 16-in. weighing screw. The latter, in turn, discharges the required amount of material to the kiln feed elevator. The balance returns *via* a separate screw and elevator circuit for return to the kiln feed silo.

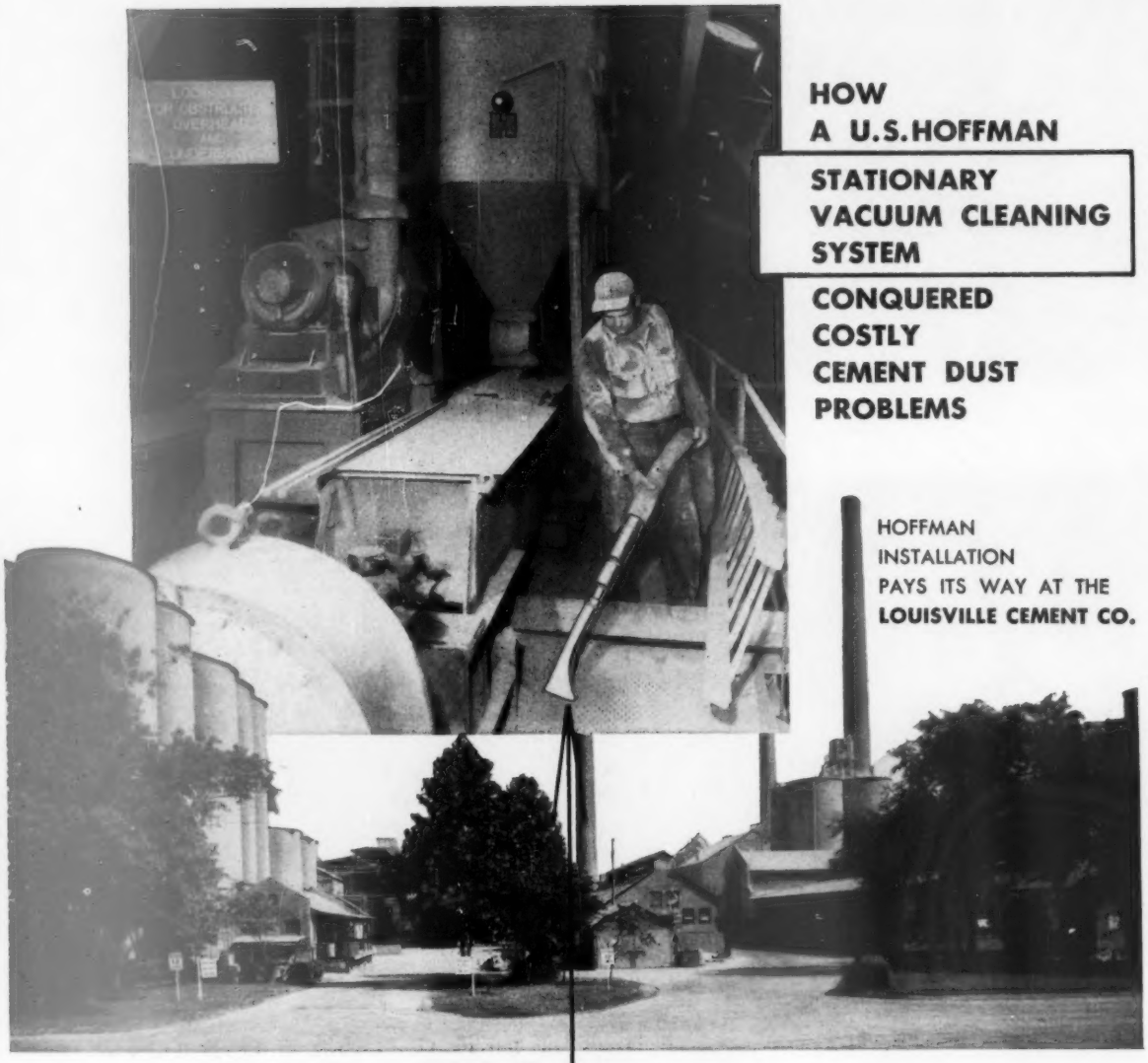
Dust from the cyclone collectors preceding the bag filter for kiln gases is also delivered to the kiln feed elevator and, like the material from the "bubble" tank, it is weighed and recorded for the total kiln feed.

Kiln The heart of the operation is an 11-ft. 6-in. by 400-ft. kiln. Riding on five supports, it is sloped at ⅜ in. per ft., and is driven at 60-75 r.p.h. by a 150-hp. motor. A 55-hp. gasoline engine provides emergency drive.

Natural gas, with an 1,100-B.t.u. rating, is used for firing through a 5-in. by 10-ft. burner pipe, and burning zone temperature is 2,750 deg. F. Firing zone temperature is monitored by optical pyrometer, and thermocouple measurements are picked up by a collector ring ahead of the burning zone (about mid-point of the kiln). Induced draft is provided by a 700-hp., 700-r.p.m. fan with a 230,000-c.f.m. rating at 650 deg. F. Hood pressure is held at about 0.1 in. water gauge and excess oxygen is maintained at one percent.

Kiln gases leaving the feed hood at 1,250 deg. F. are reduced to 800 to 900 deg. in the battery of cyclones, and are further cut to 525 to 550 deg. before reaching the i.d. fan ahead of the filter baghouse. This is done by automatic operation of air dilution dampers.

In other automatic phases of kiln control, fuel/air ratio regulation is maintained by an oxygen controller actuated by an oxygen analyzer. Fuel flow is automatically regulated in response to thermocouple signals on product temperature. In a standard procedure, kiln and feeder



HOW A U.S.HOFFMAN STATIONARY VACUUM CLEANING SYSTEM CONQUERED COSTLY CEMENT DUST PROBLEMS

HOFFMAN INSTALLATION PAYS ITS WAY AT THE **LOUISVILLE CEMENT CO.**

before ← → **after**

a U.S.Hoffman stationary vacuum cleaning system was put into operation at the Louisville Cement Co., plant in Speed, Indiana, these were among their cement dust problems:

1—Considerable spillage occurred in loading with little or no salvage.

2—Three to four men were required to clean up hopper cars after a day's loading.

3—Broom sweeping wasted usable cement and created a health and safety hazard.

4—Efficiency was impaired by poor housekeeping resulting from dust ridden plant area and RR sidings.

5—Manual removal of cement from overloaded hopper cars and trucks caused costly delays.

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1—Cement previously lost in spillage was reclaimed as a saleable product.

2—One man and a U.S.Hoffman stationary vacuum system handled the entire cleaning job.

3—End to broom sweeping eliminated health and safety hazard, saved cement.

4—Improved housekeeping at RR sidings and in plant area increased efficiency and production.

5—Savings resulting from speedy vacuum system removal of excess cement alone more than paid for the installation within a year.

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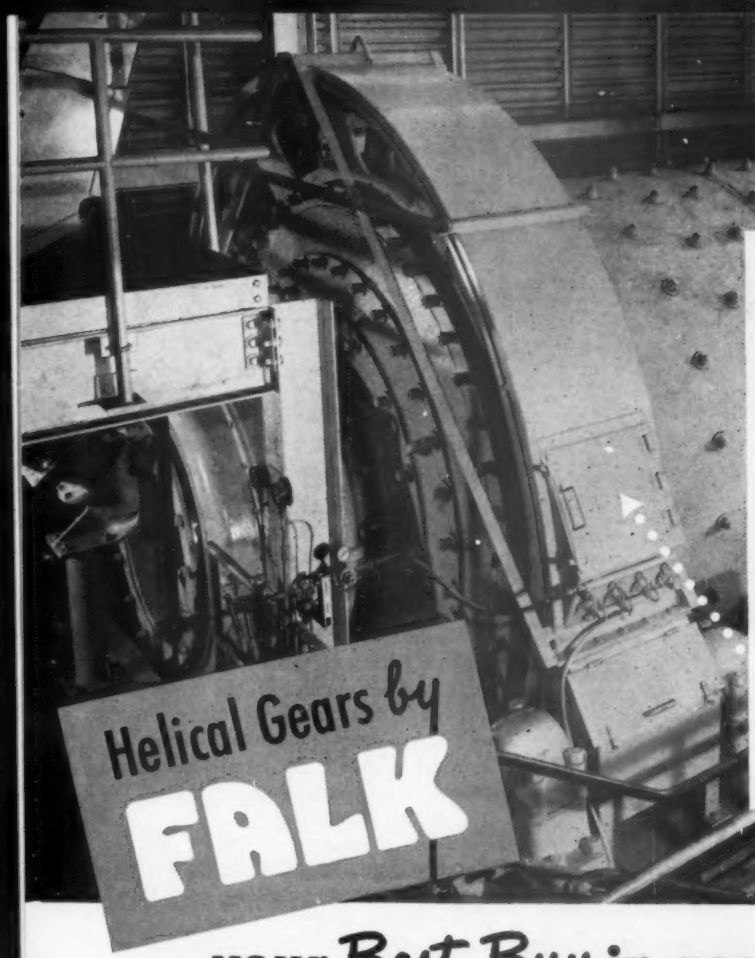

FALK PRECISION HOBBING MEANS LONGER GEAR LIFE

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Other superior features include: high reduction ratios which permit use of higher motor speeds for greater efficiency and reduced power costs; maximum resistance against abrasive wear; smooth, helical gear action. All these factors contribute to the long service life of trouble-free operation for which Falk gears are famed the world over.

When expanding or remodeling your production facilities, it pays to remember that the performance of your equipment will not be any better than the performance of the gears that drive it. So, if uninterrupted production is important to you, specify Falk Helical Gears. They're available in sizes up to 23½ ft. in diameter...in capacities up to 3000 hp.

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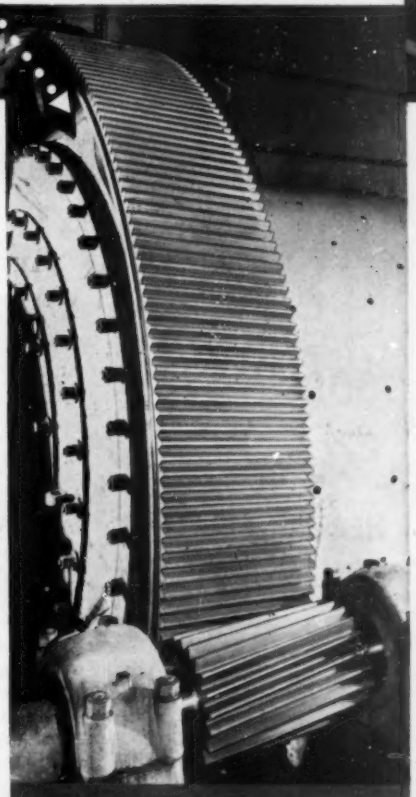

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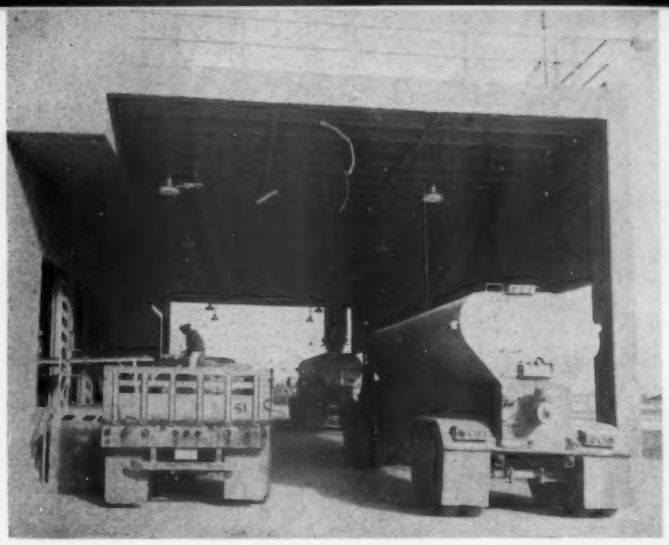

TRUCK SHIPMENTS of both sacked and bulk cement are shown being loaded simultaneously. On the opposite side of the packhouse is the rail loading dock.

drives may be regulated individually, or in an interlocked system.

Clinker discharged from the kiln is dropped to a 7- by 50-ft. grate-type cooler equipped with a 20-hp. variable-speed drive. A 150-hp., 77,320-c.f.m. fan delivers air to the cooler.

After passing through a breaker at the end of the cooler, the clinker is received on an 18-in. by 75-ft. pan conveyor, and is transferred to a 30-in. belt conveyor that supplies the clinker stacker. Dust removed from the cooler vent by cyclone collectors is placed on the pan conveyor with the clinker. These materials are also weighed in transit and recorded.

As noted previously, the clinker handling system and feed to the finish mill are identical to those in the raw-material milling circuit.

Loading Finished products from the finish mill separator are delivered *via* Airslide to a pump for transfer through an 8-in. line to a distribution system above the storage silos. The ten silos are 121 ft. high and have individual capacities of nearly 15,000 bbl. On the top are an alleviator, a dust collector, a rotary screen, and distribution lines. Cement from the finish mill is transferred *via* Airslide from the incoming line to the first two silos, and by 18-in. screw conveyor to the remainder.

Draw is made through rotary valves into 16-in. Airslides for transfer to a bucket elevator. The latter, in turn, discharges to the rotary screen, from which the flow may be directed to truck bulk loading only, to both truck- and rail-loading points, or to bagging machine surge bins in the packhouse.

In an alternative system, if the above elevator is shut down, two smaller elevators normally used to return excess cement from the bagging machines to their surge bins may be utilized. Each of the two automatic 4-spout packers can deliver 28 sacks of cement per minute. Truck and rail bulk loading are accommodated in covered docks on opposite sides of the packhouse. Sacked cement may be loaded from either dock *via* flexible conveyors.

To handle rail shipments, over 10,000 ft. of spur trackage was laid, connecting with the main line of the Texas & Pacific R.R.

Cement samples taken from the storage silos and packhouse are transferred to the laboratory through a pneumatic tube system.

Utilities One unexpected problem arose during the construction of the plant. It was found that water obtained from the service well sunk on the property was high in sulphate, and was highly alkaline. To prevent corrosion of the water-cooled kiln trunnions and compressors, plus the watercooled bearings of the i.d. fan, it was necessary to install a water treatment plant.

Electric power is obtained from a local utility company, and natural gas from local producers.

"TODD THERMO" installation at cement plant; capacity approx. 10,000,000 BTU-HR.

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Cement Plant a Primer

(*Continued from page* 163)

hose at the bottom of each silo will be cut off automatically when the correct load is reached.

The high speed of loading (a direct result of the loading control equipment and the elevation of the silos) is accompanied by a minimizing of paper work. Both the type registering beam and the Printomatic can handle complete bills of lading in quadruplicate.

With the 200,000-bbl. storage available in the above silo installation, the total storage capacity at Ada was raised to 500,000 bbl. All shipments of sacked cement are handled from the older storage and packhouse installation of plant No. 1.

Laboratory In addition to the various checks on material in process noted previously, the laboratory crew is provided with the latest equipment for finished product and physical testing. The quality of the plant's output is the primary responsibility of a 9-man force under Carmon Hargis, chief chemist. Results of their lab tests are phoned hourly to the central control room to expedite any necessary corrections to material at various stages.

Utilities Electric power, received from a utility at 4,160 v., is distributed to substations in the plant and quarry to meet the demands of a connected load totalling more than 24,500 hp. Nearly 925 miles of wiring was installed to distribute the power throughout the new facilities.

Power is fed from three different generating stations of the power company, and is delivered through one substation equipped with automatic switches. In the event of failure of one generating supply, another can be cut in immediately. The Ada plant has the largest connected electrical load in the entire state of Oklahoma.

Personnel Overall operations are headed by Dave Howe, plant manager, who was assigned to this post in 1954. Assistant plant manager is John Relic. This is the operation where Mr. Howe first joined Ideal, and from that time to

Experienced kiln operators insist on
RINGBLASTER and Western
Super-X lead slug shell—8900 ft./lbs. muzzle energy
Shell—New paper tube—slug
Reduced velocity shell—7500 ft./lbs. muzzle energy
Super-X Zinc slug shell—penetrates deeper—for extra hard rings
Ringblaster kiln gun
THE DEPENDABLE, ECONOMICAL WAY TO SMASH KILN RINGS

Year after year industry's "first-team" for fast, low-cost "ring-smashing" in all kinds of rotary kilns has been Ringblaster and Western Industrial Shells. Constant research in the Winchester ballistics labs has led to many tested improvements. The latest is a scientifically impregnated slug jacket which insures maximum power by sealing extra force behind the slug. This new tightly-rolled paper jacket is now standard on the Super-X and low-velocity lead slug shells. It is designed to eliminate even the slightest fragmentation of the lead slug, and reduces Kiln Gun maintenance problems to the lowest possible level.

With improved Western shells, Ringblaster is an even better choice for accurate ring smashing with a minimum of time, trouble and expense. Requiring fewer shots to do the job, Ringblaster cuts kiln down-time to a new low . . . makes any kiln operation more efficient. Write for details today.

RINGBLASTER KILN GUN *another product by*
Ramset® Fastening System
OLIN MATHIESON Chemical Corporation
WINCHESTER-WESTERN DIVISION
300-G Winchester Ave. • New Haven 4, Conn.

Enter 173 on card, page 257

his reassignment here, he had been at a number of other company installations, including Fort Collins and Denver, Colo.

The outstanding Ada plant is an important factor in the striking growth of the Ideal organization. The firm's annual capacity in 1945 was less than 5,000,000 bbl. Fifteen years later, with the completion of this new Oklahoma operation, that figure has been increased more than seven times. Its growth has resulted in 17 production facilities and five terminals, with which it serves an area extending from Mobile, Ala., on the Gulf, to Seattle in the Pacific Northwest—and there are no signs of slackening.

First Offshore Sulphur Mine Put in Operation by Freeport

The Freeport Sulphur Company has officially begun commercial operation of the world's first offshore sulphur mine—on a man-made island of steel seven miles off Grand Isle, La., in the Gulf of Mexico. Sulphur is pumped from deposits 2,000 ft. beneath the gulf floor. Plant capacity is 4,500 t.p.d., but it is not currently in full production.

Sulphur is piped ashore in molten form through an insulated and heated pipeline, and then barged to market. The plant was built in sections on shore, and then assembled in the Gulf. Total cost of the plant will be $30,000,000.

Humble Oil and Refining Company discovered the sulphur deposits while drilling for oil. Sulphur rights were assigned to Freeport, and both companies are to share in the profits.

Flintkote Opens Lime Plant, Considers Nevada Operation

Utah Lime and Stone Company, a subsidiary of The Flintkote Company, has placed its new $1,500,000 lime plant in operation at Dolomite, Utah, about 42 miles west of Salt Lake City. The new plant utilizes the Corson-patented hydration process to produce building lime, which will be sold by Flintkote under the Miracle trade-name.

The new facility is an expansion of the original five Ellernan kilns, a hydrate plant, and pulverizing and milling units acquired about two years ago when Flintkote took over Utah Lime and Stone through an exchange of stock.

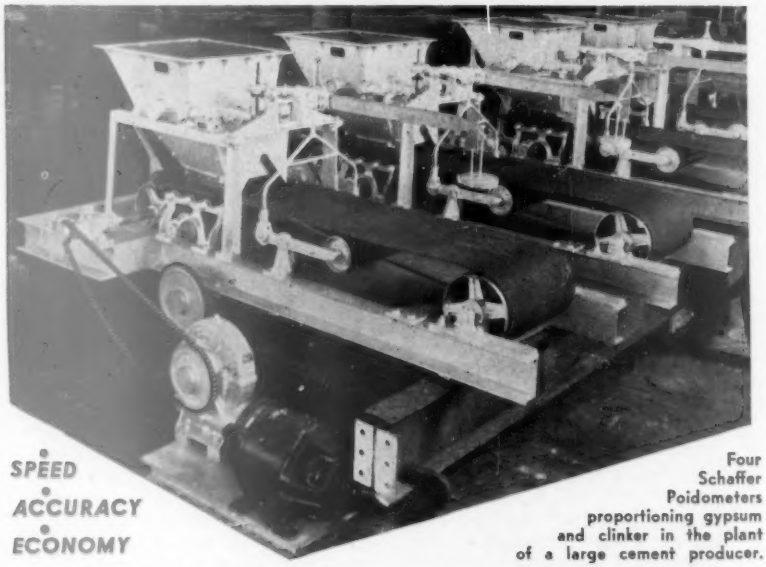
Flintkote is currently examining the possibility of producing a high-grade limestone product at Pilot, Nev. The Pilot deposit is owned by Utah Construction and Mining Company, which has entered into a "very short-term understanding" with U. S. Lime Products Corporation, a Flintkote subsidiary. Pending analysis of test shipments, a quarry operation at Pilot is contemplated.

United Sand and Gravel Corp. Formed in San Francisco

A new corporation, United Sand and Gravel Company, San Francisco, has been formed by two Marin County (Calif.) firms to supply sand and aggregates *via* a dredging operation. Partners in the corporation are A. G. Schoonmaker Company, diesel engine and parts supplier, and Associated Dredging Company, river and harbor dredging operators.

The first of a series of special dredges is now under construction.

BY WIDE ACCLAIM
BULK MATERIAL HANDLERS
APPROVE
SCHAFFER POIDOMETERS



SPEED
ACCURACY
ECONOMY

Four Schaffer Poidometers proportioning gypsum and clinker in the plant of a large cement producer.

Over 1600 Poidometers Serving In The Field

Every plant that processes or handles bulk material needs precise records of weight-data—SCHAFFER POIDOMETERS give that exactness.

Poidometers operate automatically with uniformity in weighing, blending, mixing, feeding, proportioning and recording to the utmost in accuracy.

Schaffer Poidometers are easily installed and you will be happy with the change-over because it means greater efficiency. Call us now or write for more information regarding installations that may be near you.

Send for descriptive catalog No. 5

SCHAFFER POIDOMETER CO.
2828 Smallman Street Pittsburgh 22, Pa.

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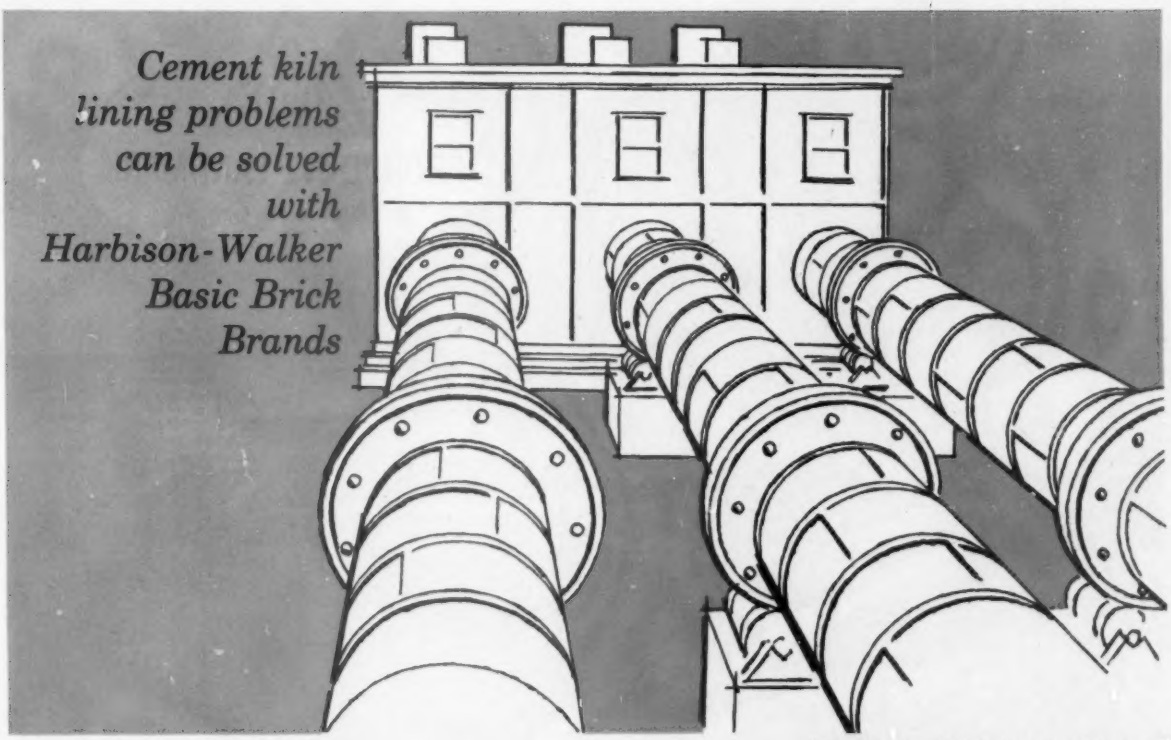
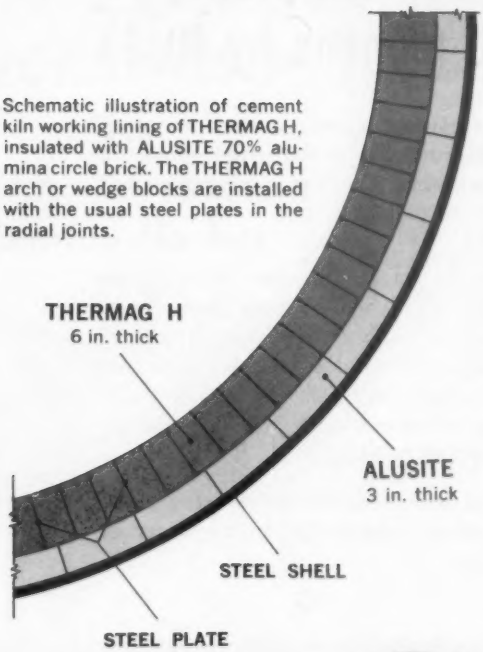
Cement kiln lining problems can be solved with Harbison-Walker Basic Brick Brands



FORMERLY H-W 6-57

THERMAG-H



Schematic illustration of cement kiln working lining of THERMAG H, insulated with ALUSITE 70% alumina circle brick. The THERMAG H arch or wedge blocks are installed with the usual steel plates in the radial joints.

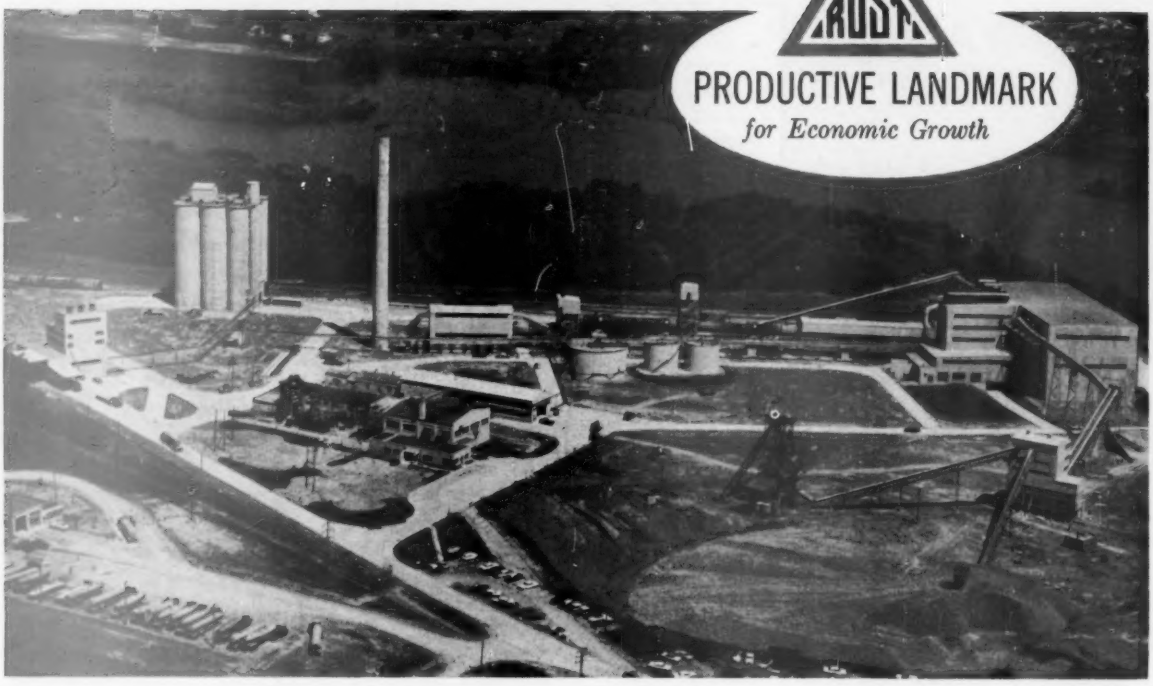
Whatever may be the normal burning zone lining life, established as months or even a year and longer there remains the incentive to prolong the service and increase efficiency. The high temperature zone generally is the most vulnerable and radiates most lost heat. The many operating variables necessitate the use of the particular types of basic refractories best adapted for a given set of conditions in order to assure best economy. For the development of a protective and insulating coating of optimum thickness, the basic brick composition and softening point need to be compatible with these properties of the cement clinker produced.

Among the various different classes of Harbison-Walker basic refractories regularly used with good economy in rotary kiln linings, THERMAG H (formerly H-W 6-57) merits special consideration for unusually severe conditions. This duo-spinel bonded basic refractory of very hard burn is solving some difficult service life problems. In some kilns which are operated at exceedingly high temperatures, linings of this brand are insulated with ALUSITE 70% alumina brick and service is not impaired. The refractoriness of THERMAG H is adequate for maintaining a moderate coating which also adds to the overall insulation.

For conditions under which lining life at best is short, this unusual basic refractory warrants your investigation.

Harbison-Walker Refractories Company
And Subsidiaries
General Offices: Pittsburgh 22, Penna.
World's Most Complete Refractories Service

HW 60-11



Columbia-Southern's new cement plant constructed in 10 months by RUST

An entirely new 1,500,000 barrel a year cement plant was constructed in 10 months by Rust Engineering at Barberton, Ohio, for Columbia-Southern Cement Corporation. This wet process plant was placed in operation on schedule.

A view of 460' rotary kiln at Barberton, Ohio. Rust erected and lined the kiln.

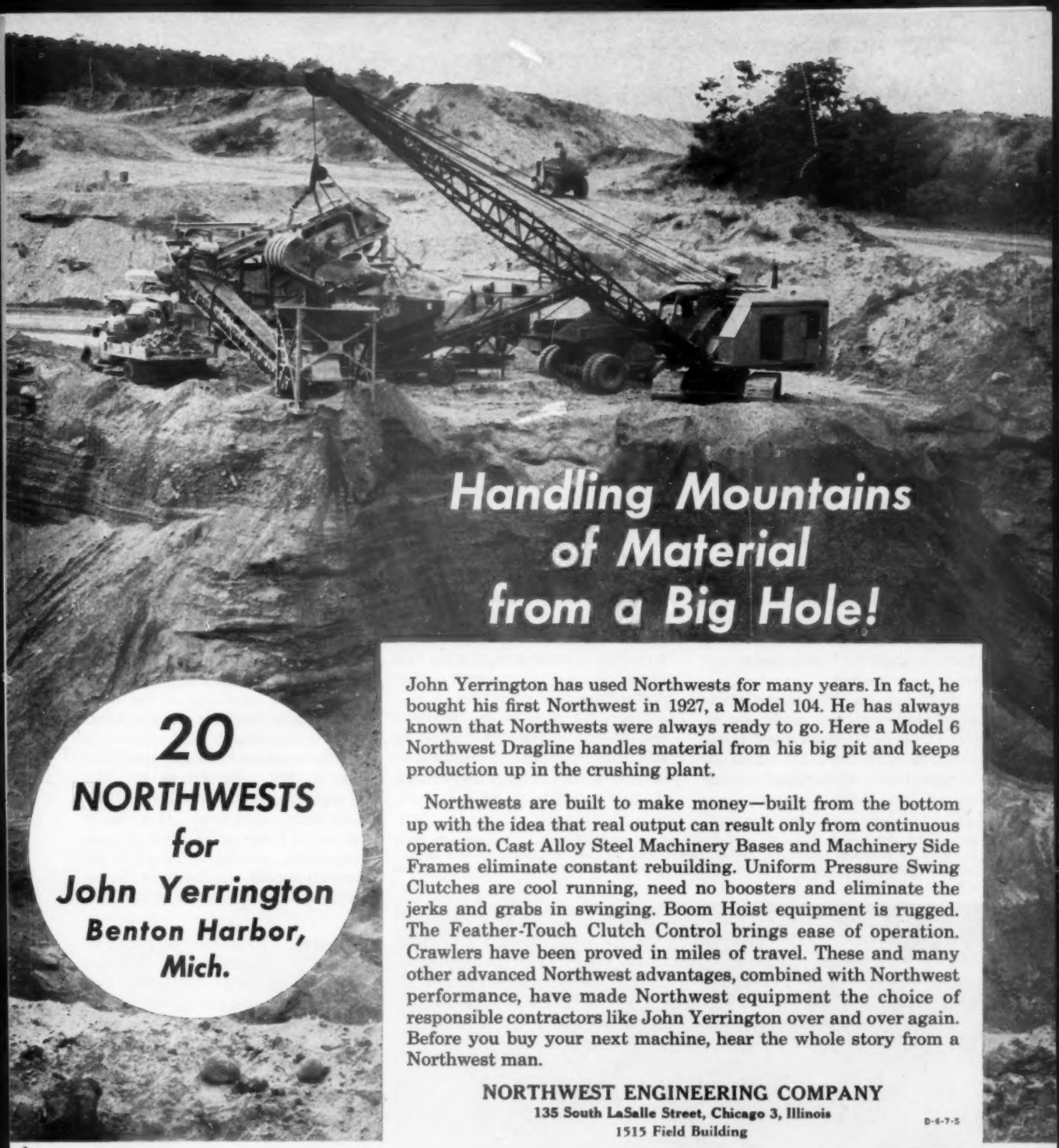
Besides the rotary kiln, the coal and raw limestone conveyors and three slurry tanks, a number of buildings were erected by Rust. These included the dust collector, kiln feed end, raw mill and finish mill, service building, pump house and the storage, packing and shipping building.

Rust has designed and constructed many 'Productive Landmarks' in a variety of industries.

THE RUST ENGINEERING COMPANY

- 930 Fort Duquesne Boulevard, Pittsburgh 22, Pa.
- 2316 Fourth Avenue, North, Birmingham 3, Ala.

C-1



Handling Mountains of Material from a Big Hole!

20 NORTHWESTS for John Yerrington Benton Harbor, Mich.

John Yerrington has used Northwests for many years. In fact, he bought his first Northwest in 1927, a Model 104. He has always known that Northwests were always ready to go. Here a Model 6 Northwest Dragline handles material from his big pit and keeps production up in the crushing plant.

Northwests are built to make money—built from the bottom up with the idea that real output can result only from continuous operation. Cast Alloy Steel Machinery Bases and Machinery Side Frames eliminate constant rebuilding. Uniform Pressure Swing Clutches are cool running, need no boosters and eliminate the jerks and grabs in swinging. Boom Hoist equipment is rugged. The Feather-Touch Clutch Control brings ease of operation. Crawlers have been proved in miles of travel. These and many other advanced Northwest advantages, combined with Northwest performance, have made Northwest equipment the choice of responsible contractors like John Yerrington over and over again. Before you buy your next machine, hear the whole story from a Northwest man.

NORTHWEST ENGINEERING COMPANY
135 South LaSalle Street, Chicago 3, Illinois
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NORTHWEST Always Ready to GO

NORTHWEST EQUIPMENT IS BUILT IN THE FOLLOWING SIZES

SHOVELS	CRANES	DRAGLINES	PULLSHOVELS	TRUCK CRANES
¾ Yd. to 2½ Yd. Capacity	13-Ton to 60-Ton Capacity	¾ Yd. to 3 Yd. Capacity	¾ Yd. to 2½ Yd. Capacity	25-Ton and 35-Ton Capacity

Maintained Kilns MEAN: Maintained Production

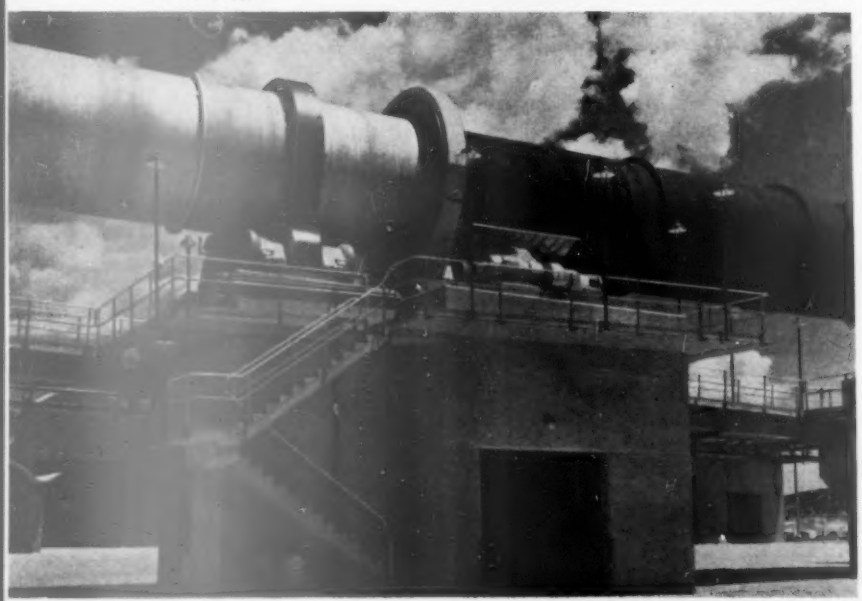
THE cement rotary kiln, with its immediate auxiliaries, is the one industry machine selected on the basis of 24-hour-a-day continuous production. Realization of this continuous production requires strict maintenance controls and careful operation because lost production due to unplanned shut-downs can never be regained.

Since it is one of the largest pieces of moving machinery made, the rotary kiln presents many maintenance problems. To these are added the complications of temperature extremes, climatic conditions, operating variables, and support equipment vagaries under which the kiln must operate.

Operations and maintenance are interdependent in many ways, but this most important interrelationship is with respect to the life of the kiln refractory lining. To allow operation to be as nearly continuous and uniform as possible, maintenance must preserve lining life by providing a constantly straight, true kiln shell, and by preventing shut-downs whenever possible.

Operation must be as consistent and uniform as possible, so that the kiln shell will not be distorted by general or local areas of overheating.

As one of the largest items of moving machinery made, the rotary kiln presents many maintenance problems which are further complicated by such extraneous factors as temperature extremes, climatic conditions, operating variables, and vagaries of support and auxiliary equipment.



Thin or spotty linings should be replaced before they lead to hot spots on the shell.

General operating speeds can also be important. To ensure trouble-free operation of the kiln, from the standpoint of natural frequency vibration, the natural frequency of the kiln should be well out of the range of operating speeds. If the natural frequency of the kiln were to coincide with an operating speed, there would be violent oscillation of the kiln on the carrying rollers, plus severe knocking at the main gear and in the drive speed reducer.

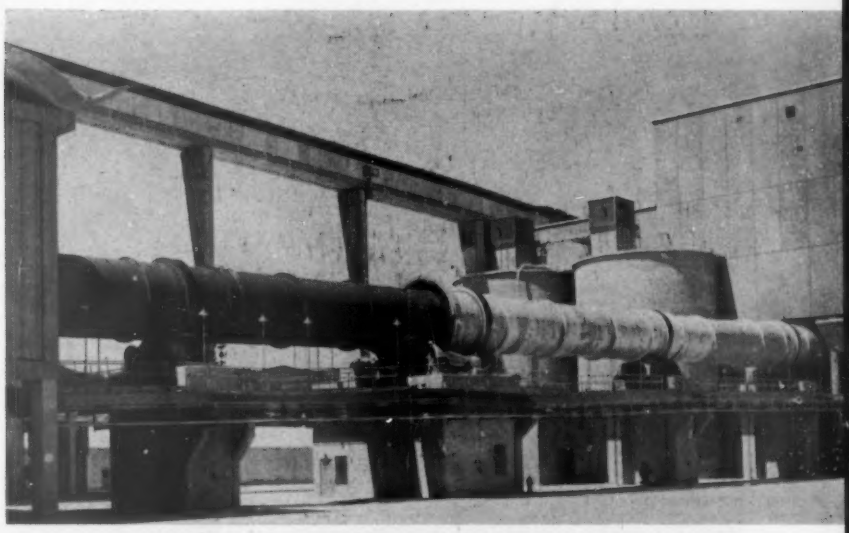
If this condition were allowed to continue, serious damage could occur in the kiln and in the kiln foundations; and breakdown of the kiln drive could result. If a change in speed range of the kiln is contemplated, investigate the effect the revised speeds may have on the vibrational characteristics of the kiln.

Records To conduct scheduled or emergency maintenance in minimum time, complete and accurate records are extremely valuable. Daily operating information and, more especially, complete maintenance history may pinpoint abnormal operating conditions or establish whether some kiln components require special attention.

GENERAL MAINTENANCE

Kiln Alignment Correct and well established alignment is one of the most important maintenance objectives. Although great care may be taken in the design and construction of concrete piers, settling or tipping of the kiln foundations may occur, throwing the carrying mechanism bases

By ROBERT M. BLIEMEISTER
Allis-Chalmers Mfg. Co.
Processing Machinery Dept.



Correct and well-established alignment is one of the most important maintenance objectives. A bowed or warped shell places excessive loads on various carrying mechanisms.

and rollers out of alignment. This condition must be corrected or it will lead to continuing trouble with the kiln shell, riding rings, and carrying and thrust rollers.

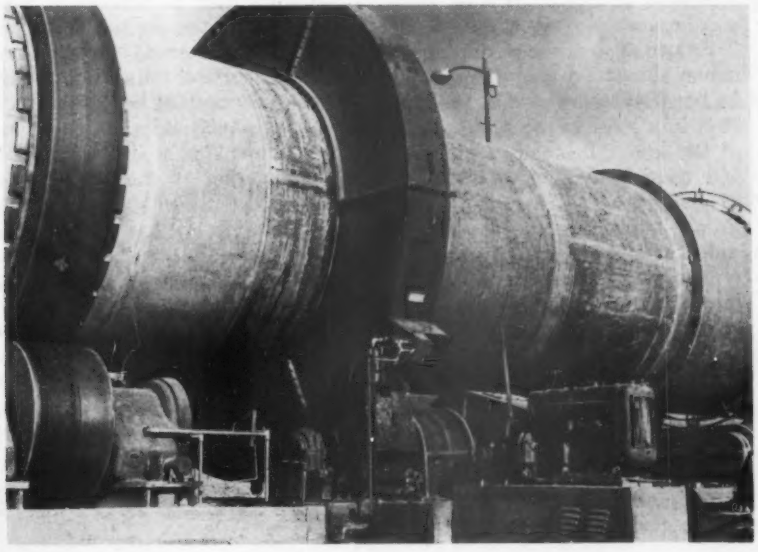
Consequently, it is advisable to establish bench marks away from the kiln foundation when the original installation is being made. Kiln alignment can then be checked from the bench marks at recommended intervals, i.e., within six months after the initial installation, and then annually thereafter.

Warping A kiln operating with a bowed or warped shell will place excessive loads on various carrying mechanisms. This is particularly true of multiple-support kilns. A warped shell can, of course, lead to continual trouble by decreasing brick life. When a hot kiln is stopped for any reason, as in the case of power failure, it is imperative to keep the kiln rotating with the emergency drive. Failure to do so may result in a warped or distorted shell, and it is difficult to return a warped shell to its original condition.

Sometimes a warped kiln can be returned to somewhat its original alignment by carefully heating the shell on the side opposite the warp and then rotating the kiln to bring it back in line. However, at best, constant attention must thereafter be given to the carrying mechanisms to provide an alignment that will not cause additional damage or excessive wear.

Sometimes the only possible way to correct a warped or bowed condition or a misaligned shell is to cut out a portion of the shell, realign riding rings and carrying rollers, and weld the shell section back. This may result in a slightly crooked shell, but it is of major importance to have the riding rings and carrying rollers properly aligned.

Omission of an emergency drive is false economy—the small additional cost provides insurance against serious difficulties that could arise from stopping a hot kiln.

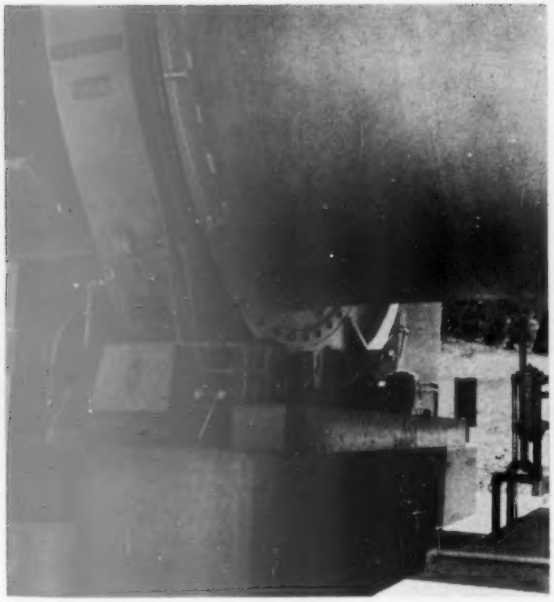


Carrying Roller Adjustment Excessive wear due to heavy localized loading may be encountered if the rollers and riding rings do not make contact across the full width of face, or if the rollers are cut excessively.

Most carrying mechanisms are equipped with adjusting screws for roller and bearing adjustment; and rollers can be adjusted correctly by means of these screws.

Thrust rollers are designed to carry the full downhill thrust of the kiln, with the riding ring and roller faces lined up for full bearing across the width. Carrying rollers should be set parallel to the axis of the kiln or cut slightly uphill to ensure that rollers are not cut downhill.

Should an occasion arise that demands cutting the carrying rollers,



This kiln is equipped with an automatic spray lubrication system for the drive gear. Such systems are optional items with new kilns, and can also be installed on older units after removal of oiling pinions.

it is better to cut more than one set of rollers equally, rather than to take all the cut on one set. If only one set of rollers is cut to move the kiln in a given direction, and another set of rollers is cut to move the kiln in the opposite direction, such action, if continued, would cause these sets of mechanism rollers to work against each other.

Carried to extremes, this action could cause misalignment between a given set of rollers and the corresponding riding ring, resulting in unequal and aggravated wear between the ring and roller surfaces.

A record of all roller adjustments should be kept as an aid to maintaining proper alignment.

Drive System In most kiln designs, the kiln drive is located close to the thrust ring to maintain proper relation between the main gear and the driving pinion, regardless of the expansion and contraction of the kiln.

The main gear, usually a spur gear, is made in halves, with full machined teeth to permit reversing of the gear for double life. This gear is bolted to a gear flange which is welded to the kiln shell. The driving pinion is mounted on a jackshaft coupled to the low-speed shaft of an enclosed gear reducer.

The latter unit and the jackshaft assembly are fixed to the foundation on the same slope as the kiln. The driving motor is usually connected to the high-speed shaft of the gear reducer through a multiple V-belt drive, with the motor also mounted on the same slope as the kiln. Ball bearing motors should always be used, since oil will run out of the bearings on a sleeve bearing motor.

The drive system should also include an emergency drive unit, either an internal combustion engine or a motor supplied from an auxiliary power source. Omission of an emergency drive from the initial installation is false economy, since the small additional cost provides good insurance against serious difficulties.

Proper mesh of the main gear and pinion should be maintained, since improper meshing of the teeth results in a jerky or vibrating motion of the kiln. Inadequate clearance will cause bottoming of the main gear on the base of the pinion teeth. Proper adjustment of the carrying rollers should prevent this condition.

If adverse clearance is allowed to continue, with a resulting scoring of gear teeth and peening of pinion teeth, it will be necessary to reverse the gear and pinion before such action is normally necessary, and then to reset the drive accordingly.

Misalignment of the kiln or pinion may also cause the teeth to wear to a taper, resulting in inferior gear action and shorter life.

CHECKING ALIGNMENT

Horizontal Alignment The original centerline of carrying mechanism bases should be confirmed. To do this, establish an offset centerline, preferably with piano wire, along the side of the kiln from the first to the last support where visibility is unobstructed. (See p. 185, Fig. 1.) This offset centerline should be equi-distant from the centerline marks on the carrying mechanism bases at the two extreme supports of the kiln. By tramming from this offset centerline, determine whether the centerline marks on the carrying mechanism bases are all in line.

If the intermediate piers are not in line, determine whether they or the end piers have settled before proceeding with the alignment work. Some changes may be required in order to bring either the bases or piers into line, depending on whether or not the settling has reached its final stages.

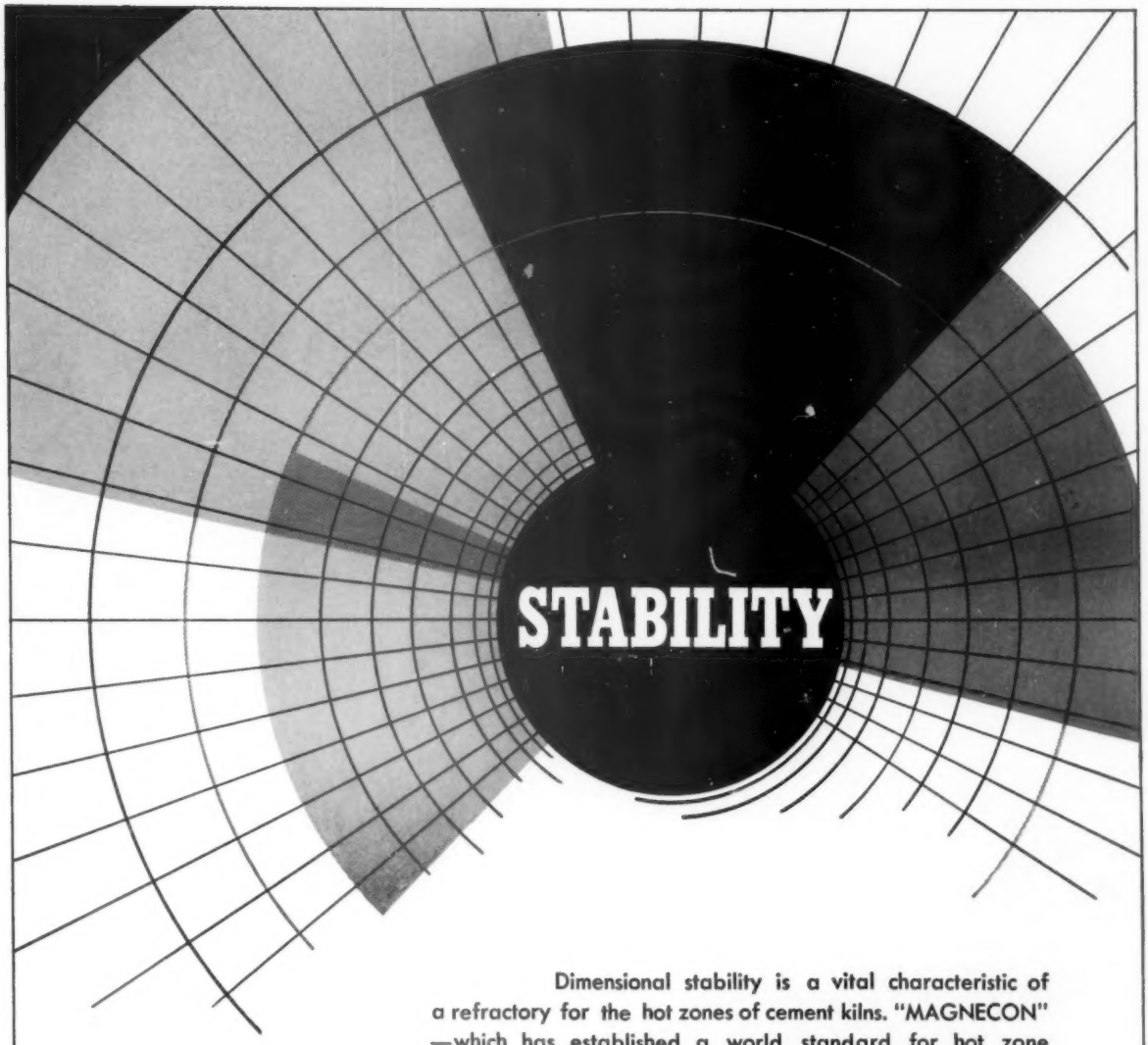
If no further settling is anticipated, or in cases where no settling has taken place, the offset centerline should be permanently located by setting lead or brass markers into the piers or floor. The true centerline should be clearly marked on each carrying mechanism base by tramming from the offset centerline.

The setting of the kiln shell in relation to the true centerline of the bases should also be checked. This can be done by stringing a cord with a plumb bob attached to each end over the top of the shell as near the riding rings as possible. If there are irregularities in the shell, the cord should be strung over the wearing faces of the riding rings. This cord must be long enough to permit the plumb bobs to hang free beneath the kiln, as shown in Fig. 1. The midpoint of the distance between these plumb bobs is the center of the kiln shell at that position. Mark this point on the bases and proceed with the same operation at the next support.

Rotate the shell 90 degrees and repeat the markings at each support. The mean of the four marks at each quarter point through a complete revolution will then indicate the path from support to support of the true centerline of the kiln shell.

This check will indicate one of

(*Continued on page* 185)



Dimensional stability is a vital characteristic of a refractory for the hot zones of cement kilns. "MAGNECON" —which has established a world standard for hot zone liners—has very high dimensional stability. "MAGNECON" was the refractory selected for seven of the largest cement kilns in the world, all newly completed or still a-building:

Miron Freres, Montreal, Que.
Kiln 550′ x 15′ diameter

Ciments d'Obourg, Obourg, Belgium
Kiln 525′ x 15′ 7″ diameter
Kiln 525′ x 14′ 7″ diameter

Dundee Cement Co., Dundee, Michigan
2 kilns 460′ x 16′ 6″—15′
—16′ 6″ diameter

Ciments Liegeois, Harcourt, Belgium
Kiln 475′ x 13′ diameter
Kiln 510′ x 14′ 5″ diameter

CANADIAN REFRACTORIES LIMITED
CANADA CEMENT BUILDING, MONTREAL, CANADA

1908

products

Continuous expansion of facilities maintain The Tool Steel Gear & Pinion Co. leadership in supplying the cement industry with products and services of superb quality. For example, Tool Steel's Maag gear cutter is the biggest in the world. It can cut gear teeth on gears with a 197" diameter and a 20.8" face. It can cut helical gears up to 190" diameter, 15 degree helical; and 177" diameter and 30 degree helical. High quality precision cutting, combined with a rapid delivery schedule, is a service that cement plants receive when they send their big gears to us for cutting or recutting.

"Tool Steel Process" hardened products are available for practically every key point in cement equipment, including pulverizers, mixers, drag lines, kilns, dryers, shovels, cranes.

Checking gear teeth for accuracy after cutting.

Big 11½ foot cement mill bull gear being recut at Tool Steel.

and service unlimited

TSP Hardened Products are specifically designed, produced and guaranteed to out-perform, out-last any competitive product in the same service. A special hardening process achieves a file hard surface to the full depth of permissible wear. The core is refined for toughness and ductility. If you're interested in keeping your equipment running better and longer, write today for a free copy of our fully illustrated brochure "TSP Products for the Cement Industry."

THE TOOL STEEL GEAR AND PINION CO.

CINCINNATI 16, OHIO, U.S.A.

The Standard of Quality Since 1909 for Gears • Pinions • Rolls • Wheels and Other Hardened Products

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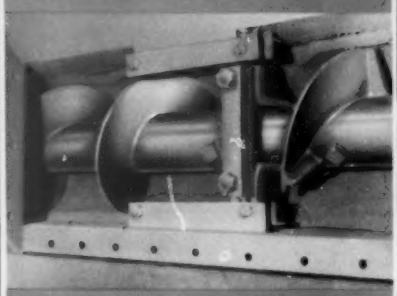
Close-up of TSP wheels on bucket crane after several years service.

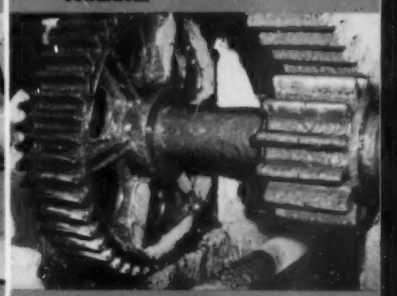
TSP trunnions and gearing on rotary dryer.

Close-up of TSP trunnions and shaft on kiln. Note smooth appearance after long service.

TSP compartment mill drive pinion. In continuous service since 1928 and still in excellent condition.

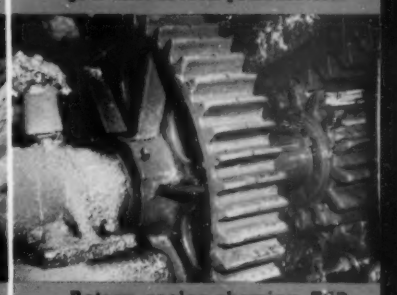


TSP gudgeons on screw conveyors deliver outstanding performance.

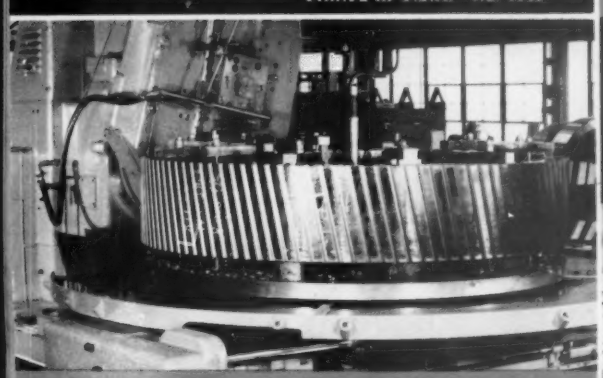


TSP main agitator drive pinion and intermediate drive bull gear after several years service.

TSP main holding and closing drums on overhead crane. Note smooth and true grooves on TSP drums.



Rotary cooler showing TSP drive pinions and intermediate drive bull gear after several years service.



Helical gear being cut on Tool Steel's big gear cutter.

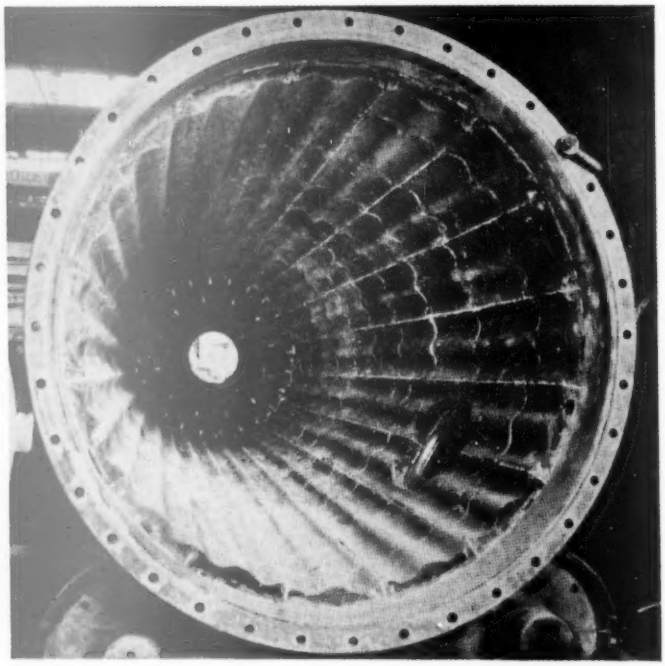
TSP Bevel gears and pinions on pulverizing mills.

TSP gearing on dryer.

TREADWELL LINERS

for BALL, ROD and TUBE MILLS

The three materials listed below give Treadwell a complete range for meeting any requirements in grinding cement. Call on our qualified engineers to recommend the proper alloy and treatment for any installation.



CHROME-MOLY STEELS

By heat treatment variety of properties are achieved insuring the best service depending on the compartment, diameter of the mill, size of balls or rods, mill speeds, etc.

300-M

Ultra high strength steel used where severe abrasion resistance is required.

NI-HARD

Treadwell cast the Ni-hard liners shown in photo of a 7′ x 26′ Tube Mill used for wet grinding cement stone.

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Manipulators, Mill, etc.
Mills, Billet, Merchant & Bar
Mills, Rod
Special Machinery
Coilers & Reels

Conveyors, Coil
Drives & Pinions
Ejectors, Furnace
Gauges, Shear, Saw, etc.
Beds, Cooling,

Mills, Vertical Edging
Tables, Mill
Tables, Tilting & Lift
Tables, Transfer
Transfers

Beds, Inspection
Bumpers, Furnace
Pushers, Furnace
Repeaters
Handling Equipment (Kick-offs, Pilers, Cradles, etc.)

CASTINGS—Electric Furnace Steel, Ductile Iron, Gray Iron and Ni-Hard

Kiln Maintenance

(*Continued from page* 180)

the following four conditions:

1. The centerline of the shell coincides with the true centerline of the bases established above.
2. The centerline of the shell is diagonal to the true centerline of the bases.
3. It is parallel, but offset, to the true centerline of the bases.
4. It is bowed in relation to the true centerline of the bases.

If condition 3 or 4 applies, carrying rollers must be adjusted so that the true centerline of the kiln shell is made to coincide with the true centerline of the bases. Carrying rollers must be kept parallel to the centerline of the kiln shell and carrying mechanism bases, as shown in Fig. 1. In making these adjustments, care must be taken to maintain proper clearance at the feed end and discharge end air seals and at the main drive gear and pinion.

Vertical Alignment This check should be made when the kiln is shut down and at a time when the shell is not distorted by either radiant heat from adjacent kilns or the sun. Tape the circumference of each riding ring, so that the distance from the outside diameter of the riding ring to the center of the kiln can be determined for each ring.

Set up a transit or level on top of the kiln over the feed end riding ring, and adjust the transit so that the line of sight is parallel to the centerline of the kiln at the feed end and discharge end riding rings. Check the distance from the riding ring to the line of sight for each intermediate ring, repeating this check at quarter points around the circumference.

If the radius of each riding ring is known, the average misalignment at each mechanism can now be determined. Correct this misalignment by making the necessary adjustments to the carrying rollers. The slope of the kiln can be checked with the transit at this time.

With the kiln now in correct vertical alignment, a simple gauge can be constructed to check vertical alignment in the future without shutting down the kiln and going through the elaborate measurements outlined above. This device consists of a gauge pin or tram just long enough to reach from the mark of the true centerline on the carrying mechanism frame to the kiln shell.

A telescopic or slip pin should be made for each mechanism frame. Gauging the distance between the frames and the shell will indicate the extent of wear on the rollers and riding rings. The carrying rollers can then be moved in to return the kiln to its original elevation in minimum time.

Since the shell may not be perfectly round at the planes where the measurements are taken, reference points should be established on the shell so that the vertical distances between the mechanism bases and the shell will always be gauged at the same points on the circumference of the shell. Reference points can be made by welding four 3/4 in. nuts to the shell in each plane where measurements are to be taken. These nuts should be spaced 90 degrees apart.

A bolt can then be turned into each nut to a point where the head of the bolt will just touch the gauge pin. The bolt is then welded to the nut. Four of these bolts are used at each mechanism to provide an average reading.

Riding Ring Alignment Riding rings should not wobble as the kiln rotates since it is impossible to obtain full contact between the carrying rollers and the riding ring under such conditions. Fig. 2 shows a method for determining the amount of runout in a ring.

Two pointers are constructed of angle iron and placed as shown. The use of two pointers eliminates the effect of any kiln "float." These pointers should be mounted on the kiln pier away from the carrying mechanism and should extend to the centerline of the kiln. The edge of each pointer should be approxi-

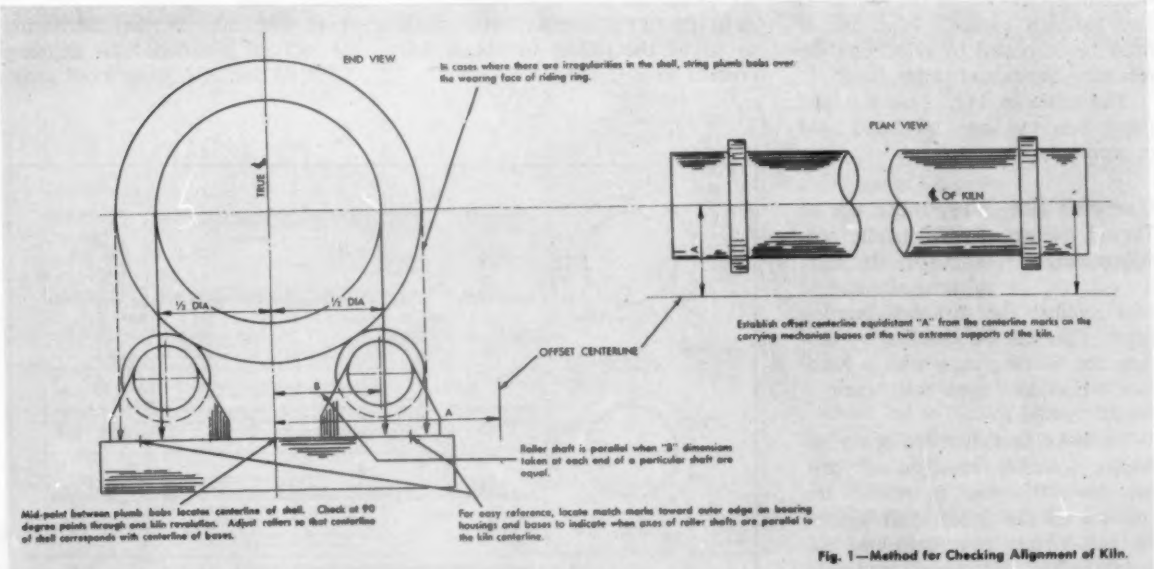
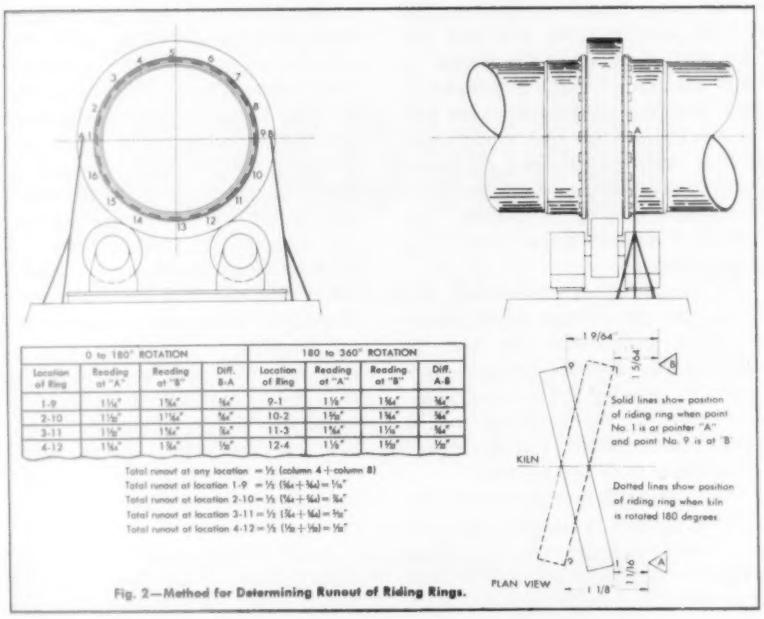

END VIEW
In cases where there are irregularities in the shell, string plumb bobs over the wearing face of riding ring.
TRUE
½ DIA
½ DIA
B
A
PLAN VIEW
℄ OF KILN
Establish offset centerline equidistant "A" from the centerline marks on the carrying mechanism bases at the two extreme supports of the kiln.
OFFSET CENTERLINE
Roller shaft is parallel when "B" dimensions taken at each end of a particular shaft are equal.
Mid-point between plumb bobs locates centerline of shell. Check at 90 degree points through one kiln revolution. Adjust rollers so that centerline of shell corresponds with centerline of bases.
For easy reference, locate match marks toward outer edge on bearing housings and bases to indicate when axes of roller shafts are parallel to the kiln centerline.

Fig. 1—Method for Checking Alignment of Kiln.


1 9/64
1 5/64
B
A
Solid lines show position of riding ring when point No. 1 is at pointer "A" and point No. 9 is at "B"
KILN
Dotted lines show position of riding ring when kiln is rotated 180 degrees
1 1/16
1 1/8
PLAN VIEW

0 to 180° ROTATION				180 to 360° ROTATION			
Location of Ring	Reading at "A"	Reading at "B"	Diff. B-A	Location of Ring	Reading at "A"	Reading at "B"	Diff. A-B
1-9	1 1/16"	1 3/64"	1/64"	9-1	1 1/16"	1 1/64"	1/64"
2-10	1 1/32"	1 1/64"	1/64"	10-2	1 1/32"	1 1/64"	1/64"
3-11	1 1/32"	1 1/64"	1/64"	11-3	1 1/64"	1 1/32"	1/64"
4-12	1 1/64"	1 1/64"	1/32"	12-4	1 1/32"	1 1/32"	1/32"

Total runout at any location = ½ (column 4 + column 8)
Total runout at location 1-9 = ½ (1/64 + 1/64) = 1/64"
Total runout at location 2-10 = ½ (1/64 + 1/64) = 1/64"
Total runout at location 3-11 = ½ (1/64 + 1/64) = 1/64"
Total runout at location 4-12 = ½ (1/32 + 1/32) = 1/32"

Fig. 2—Method for Determining Runout of Riding Rings.

mately 1 in. from the machined outer edge of the riding ring.

The riding ring must be fixed against one of the retaining bands by small wedges driven between the riding ring and the other retaining band at several points around the circumference of the ring.

Measurements are taken from reference marks on the pointers to the machined sides of the riding ring. A set of readings taken at 16 equally-spaced points around the circumference of the ring will indicate the location and magnitude of maximum runout. If the runout at any location exceeds 1/32 in., it must be corrected by relocating the retaining bands and riding rings.

The table in Fig. 2 shows how these readings are tabulated and interpreted.

Carrying and Thrust Roller Alignment When rollers are set parallel to the centerline of the kiln, roller shafts should bear against the downhill bearing caps. This can be checked by tapping the bearing caps with a hammer. (Loaded caps will emit a "solid" sound.)

To make certain there is no excessive downhill thrust on any cap, cut the roller just to relieve the pressure of the roller shaft against the cap. Note how much the adjusting screw was turned, and then return the roller to a setting which will just produce a light roller shaft force against the down hill bearing cap. After all rollers are adjusted, the kiln will bear against the lower thrust roller. Care must be taken to avoid excessive thrust roller loading.

Sometimes, in starting up a new kiln with the carrying rollers set parallel to the axis of the kiln, the carrying rollers and riding rings will not make 100 percent contact throughout the complete revolution of the kiln. In such cases it is better to let the rolling surfaces wear in to obtain full contact, rather than to adjust the rollers to obtain full contact immediately.

Thrust mechanisms on modern kilns are designed to carry the full thrust of the kiln. On many older kilns, however, it is necessary to carry much of the thrust by adjusting the carrying rollers, since these thrust mechanisms were not designed to take the full thrust load. To "float" the shell of such a kiln, thus reducing or even eliminating completely the thrust on the downhill thrust roller, the carrying rollers are set at a angle, as shown in Fig. 3.

The illustrations exaggerate the amount of adjustment to show the principle involved more clearly. Any such adjustments must be performed carefully with each roller, to prevent excessive pressure and its resultant wear from developing on any one roller.

The thrust roller should be installed on the down-running side of the kiln centerline, as shown in Fig. 4. This will prevent any lifting effect on the thrust roller.

Gear and Pinion Alignment The main gear is equipped with adjusting screws to facilitate centering of the gear on the shell.

This gear must run true. Several points around the circumference of the gear should be checked with a feeler gauge for uniform contact across the full face of the teeth, and flange bolts should be inspected periodically to make sure they are tight at all times. A tight fit can be achieved by pulling each bolt up tightly, then heating the bolt to about 350 deg. F. and advancing the nut an additional 20 degrees.

Pinion and gear must mesh prop-

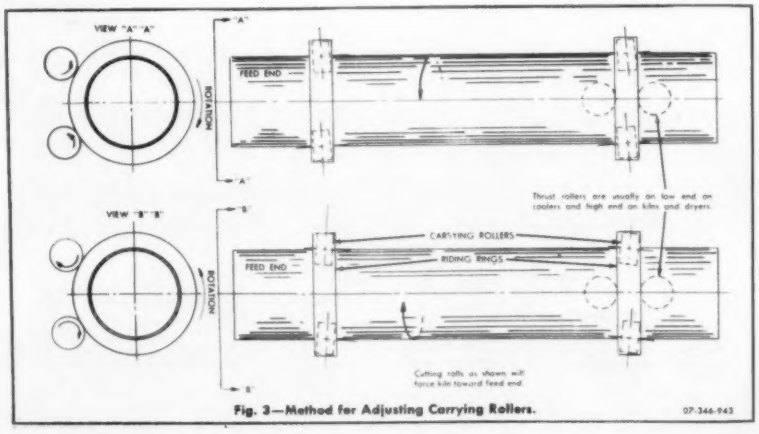


Fig. 3—Method for Adjusting Carrying Rollers.

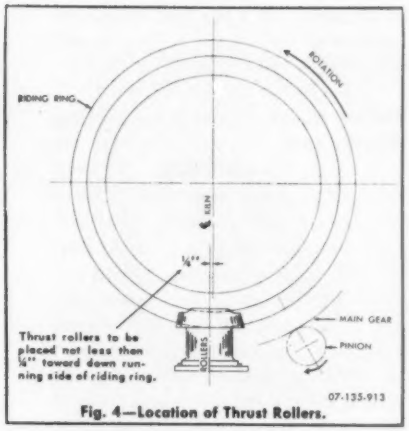


Fig. 4—Location of Thrust Rollers.

erly, as shown in Fig. 5. Pitch lines are scribed on both sides of the gear and pinion at the factory. The pinion should be set so that the pitch lines on the gear and pinion are 1/8 in. apart when the shell is cold. When the shell is hot, the pitch lines should be from 0 to 1/16 in. apart.

In no case should the pitch lines overlap, since this would cause excessive wear and overloading of the pinion shaft and bearings.

Mesh of the gear and pinion should be checked at regular intervals, since any wear or adjustment on the carrying rollers will change the mesh. If the pinion is meshing too deeply, the kiln should be raised to its original position by moving the carrying rollers in toward the centerline of the kiln.

Refacing Ring And Rollers Sometimes it becomes necessary to reface riding rings or rollers. A grinding rig, shown in Fig. 6, can be constructed on the job and used to reface the riding rings while the kiln is in operation.

The coil springs and adjusting bolts serve as a stop, so that high spots on the ring will be ground off first. In operating this refacing tool, a reference mark should be established on the side of the riding ring being ground, and the adjusting screw on the tool should be turned one revolution per revolution of the kiln to assure even grinding across the face of the ring. Any circumferential ridges on the ring must be ground off first.

If it is not feasible to operate the tool throughout a full 24-hour period, it is a simple matter to lower the grinding table on the adjusting bolts, thereby removing the carborundum blocks from contact with the riding ring.

A grinding rig can also be adapted for refacing the carrying roller by tipping the rig up on its side and setting it against the face of the roller. This can be more easily accomplished on the outer side of the carrying mechanism due to space limitations, especially at the thrust mechanism.

These rollers can also be refaced with a lathe and a cutting tool arrangement; or it may be more expedient and economical to put the kiln on cribbing and reface the rollers in the machine shop.

In either case, whether the ring and roller are to "wear in" over a period of time or whether they are to be refaced, it is essential to watch the following points: (1) that the unit is not moved off its centerline; (2) that the slope is not changed; (3) that the proper mesh between the pinion and main gear is not destroyed.

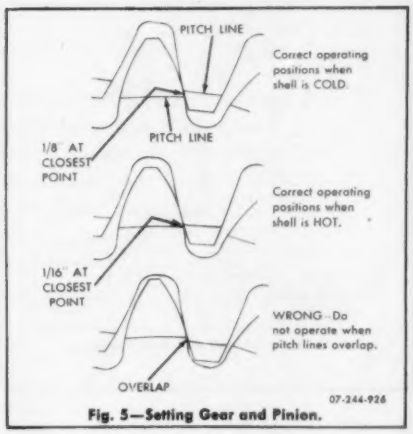


Fig. 5—Setting Gear and Pinion.

LUBRICATION

Oiling Pinion Lubrication This method of lubricating the drive consists of an oil sump built into the gear guard with an oiling pinion which meshes with the drive pinion and transfers the lubricant to the drive gear, as shown in Fig. 7.

A high grade lubricant should be used, with the following specifications:

For service: 130 deg. F. (55 C.) to 210 deg. F. (99 C.) approximate viscosity
SSU @ 210 deg. F. (99 C.): 400-550
Approximate pour point: 25 deg. F. (—4 C.) to 35 deg. F. (2 C.)

After a new kiln has been in service for a month, the oil should be drained and the reservoir cleaned. Thereafter the oil should be changed every six months.

This lubricating method has been used for many years as standard for rotary kilns, coolers, and dryers.

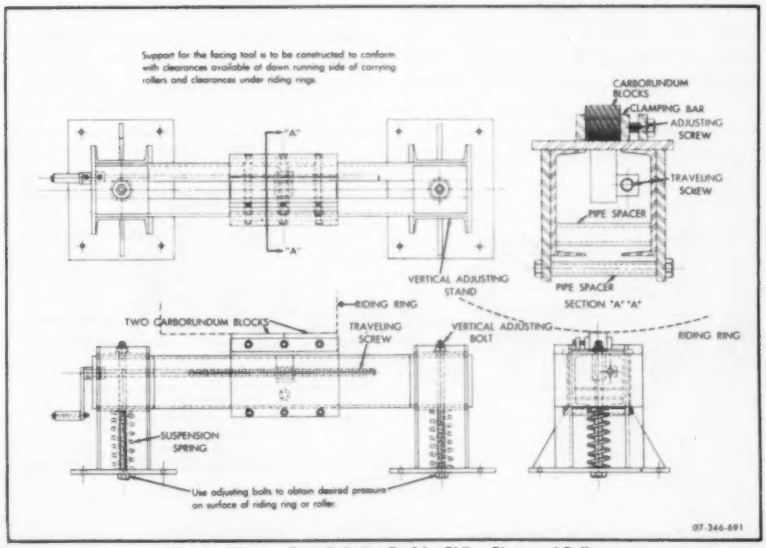
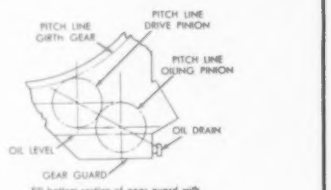


Fig. 6—Abrasion Type Refacing Tool for Riding Rings and Rollers.



Fill bottom section of gear guard with specified lubricant to level shown.

07-146-198

For Service	Approximate Viscosity Saybolt Furol @ 210° (99°C)	Approximate Pour Point
Below 130°F (55°C)	20	20°F (—7°C)
130°F (55°C) to 210°F (99°C)	105-108	70° to 85°F (21 to 30°C)

Fig. 7—Lubrication of Main Gear.

Spray Type Lubrication This system, which is furnished as an optional item with new kilns and also can be installed on present units, has the advantage of providing lubricant without an oversupply that will drip off. The spray lubricator puts a measured amount of lubricant on the working area of the drive pinion, providing efficient lubrication between the teeth of the drive pinion and the gear.

The lubricant so used is measured in ounces rather than pounds —which is important for an efficient and economical operation.

When the spray lubricator is used, the oiling pinion is not furnished. If rotary units such as kilns, coolers, and dryers are being converted to accommodate the spray system, the oiling pinion must be removed.

The spray lubricator can be of several types, but most types require air as a motivating force and a timer to regulate the lubricating interval for automatic systems. The latter have warning devices to indicate times when the equipment is inoperative, such as during an air supply failure.

Lubricant for automatic spray systems should be one of the following:

1. A heavy lubricant resembling asphalt thinned with a diluent and sprayed at room temperatures; it must have a Timken film strength of 25 lb. and a minimum of 7,000 SSU @ 210 deg. F. undiluted.

2. A viscous lubricant having the general specifications of 850 to 1,000 SSU @ 210 deg. F.; pour point to be 15 deg. F. below minimum ambient temperature; must have a minimum Timken film strength of 45 lb.

On starting units equipped with automatic spray systems, the lubricant should be applied every 15 minutes. Later the individual metering blocks can be adjusted to ⅔ or ½ stroke length. If there is still too much lubricant being applied, the frequency can be lengthened to 30 or 60 minutes, or as much as experience indicates is required.

The exact frequency must be determined by actual practice, since it is dependent on a number of variables such as lubricant adhesiveness and gear temperature.

Any of the lubricants used in spray systems drop from the gearing as waste and must be removed from the bottom and sides of the housing periodically. The lubricant is not re-used.

Provision must be made for below-normal temperatures by using heating units or by applying a lubricant of lighter viscosity. Below-normal temperatures are those that interfere with the pour points of the lubricant. When in doubt about below-normal temperatures, the lubricant supplier should be consulted.

Drive and Carrying Mechanisms Motor, gear reducer, and flexible couplings should be lubricated in accordance with instruction sheets furnished by the manufacturer.

On carrying and thrust mechanisms high-grade lubricant with specifications shown in Table I should be used. Oil levels (See Fig. 8) should be checked at frequent intervals and maintained at the proper level. In starting a new kiln, the level should be checked daily. As with drive lubrication, the oil should be changed after the first month of operation and then at six-month intervals.

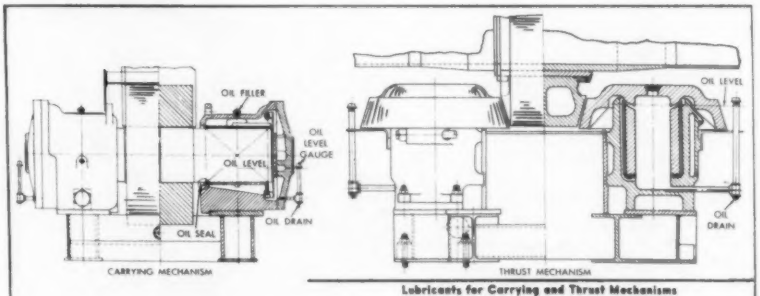
Riding Rings And Rollers Floating-type riding rings should be lubricated between riding rings and filler bars with a thick paste of graphite and just enough oil to act as a good binder. The lubricant should be applied initially to the inner surface of the riding ring at all spaces between filler bars. Subsequent applications of lubricant need to be made only at four evenly spaced points around the circumference of the ring. The lubricant can be most easily applied with an extended-nozzle hand gun.

The practice of using water baths for lubricating the faces of the carrying rollers and riding rings has been virtually discontinued because of the possible detrimental chemical action of the water.

For the prevention of spalling, a solid graphite carbon block, Dixon H-80-D or its equivalent, is now recommended. This block has cross sectional dimensions of 1 x 6 in. and lengths up to 30 in. The graphite block will effectively lubricate the faces when held against the roller face by its own weight.

A holder may be fabricated from steel plate and easily attached to the carrying roller guard. The holder and graphite blocks should be the same length as the face of the roller.

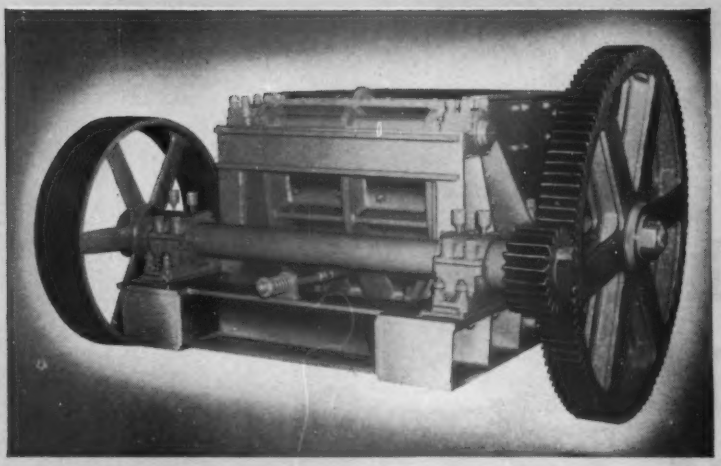
Scheduled maintenance control will do much to protect rotary kiln capital investment. Combined with considerate operating techniques it can help reduce production dips caused by unscheduled shutdowns.



Lubricants for Carrying and Thrust Mechanisms

For Service	Approx. Viscosity Saybolt Universal 100°F (38°C)	210°F (99°C)	Approx. Pour Point
at oil temperature below 130°F (54°C)	1100-1500	80-97	0 to +15°F (—18 to —10°C)
at oil temperatures betw. 130°F (54°C) and 210°F (99°C)	2000-2500	100-125	15 to 25°F (—9 to —4°C)

Fig. 8—Lubrication of Carrying and Thrust Mechanisms.



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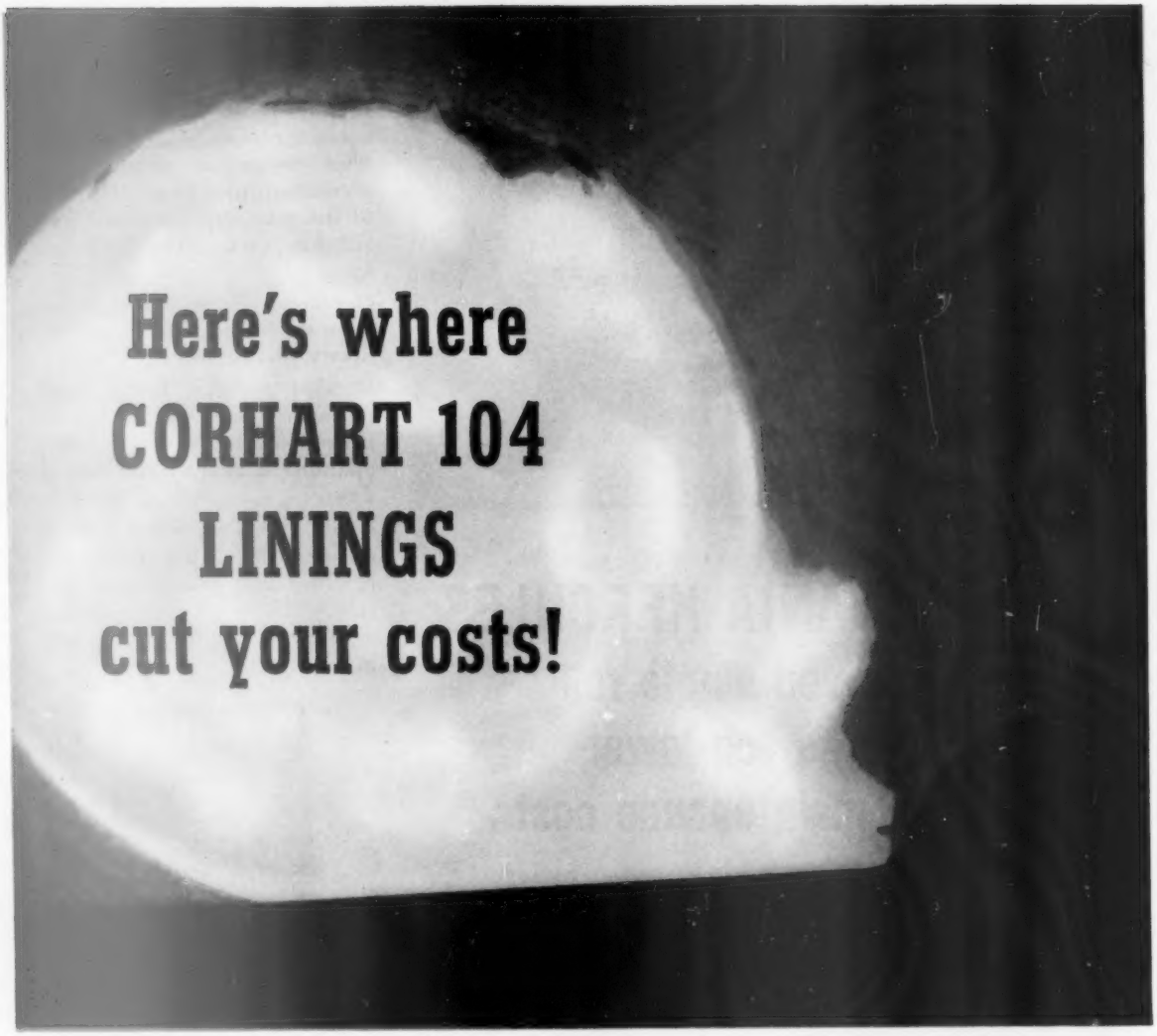

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Carbon Dioxide Gas Used To Thin Slurry in Laramie Cement Plant

saving of 4.4 cents per barrel realized

By HARRY F. UTLEY

PRODUCTION of a pumpable slurry of low moisture content has been the subject of considerable experimentation in the wet-process cement industry. Various additives have been tested with varying degrees of success, but the cost of the additives in the quantities required has usually been prohibitive.

Two basic phenomena apparently govern the viscosity, or pumpability, of a slurry of definite moisture content and fineness. One is the physical structure of the raw material itself which upon fine grinding, may or may not be excessively hydrophilic (water adsorptive). Crystalline, glassy raw materials are usually non-hydrophilic, while fine-grained amorphous shales and clayey limestones frequently are.

The second of the two phenomena affecting the water-adsorptive tendencies of the raw material is the presence of soluble salts, especially gypsum and small amounts of alkaline carbonates, or oxides.

Soaps, phosphates, and certain proprietary long-chain-carbon compounds can be used in hydrophilic slurries, but the relatively high cost usually defeats the purpose.

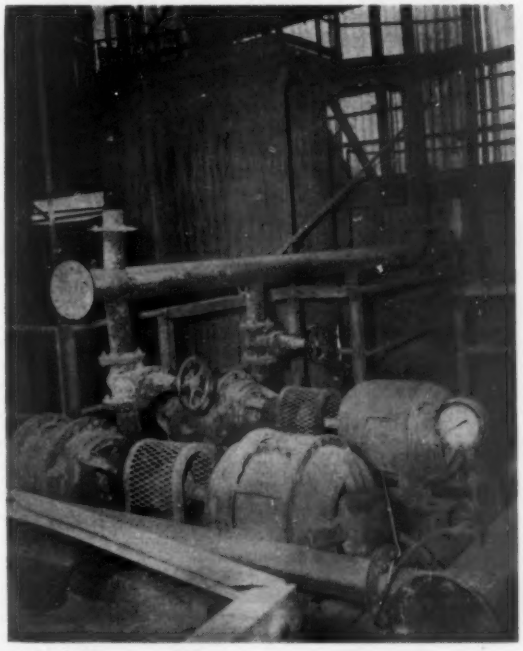
The Monolith Portland Midwest Company has operated a wet-process plant at Laramie, Wyo., since 1929. Its 10- by 11- by 341-ft. Traylor rotary kiln, when installed 30 years ago, was reportedly the longest in the industry at that time. In recent years, the company's technical personnel has experimented with thinning additives for its slurry, which has a high hydrophilic-shale content. With its particular slurry, it was found, the rate of flow increased when a pH reduction was obtained, regardless of the source of the reduction.

Accordingly, a study was undertaken to find an economical pH reducer. It was determined that weak acids which had very low (or no) reaction with calcium carbonates were very effective as pH reducers, or thinners, of the Laramie plant slurry.

In the search for a low-priced, weak acid, H_2CO_3 immediately came to attention. The plant had tons of it going out of the stack every day which could be recovered and used at little cost. Introduced in sufficient quantity, it would reduce the pH of the slurry and would carbonate any calcium oxide in the raw mix caused by cement-dust contamination or stack dust re-used in the slurry system.

The figures on page 192 show the effect of carbonating the slurry in laboratory tests. Carbonation reduced the initial pH from 9.5 to 6.9. A carbonated slurry of 39.5 percent moisture had the same viscosity as an uncarbonated slurry at 42 percent moisture. The effect of aging was slight; and the cost of using stack gas was very reasonable, less than ½ cent per bbl., while the average cost of other additives which might achieve the same result would be at least 3 cents per bbl.

To recover and utilize the CO_2 from the stack, two Nash HyTor vacuum pumps, one primarily in stand-by service, were installed, each driven by a 30-hp. G-E motor. Between the pumps and the gas take-



This picture shows the heart of the CO_2 recovery circuit in the Laramie plant. In the foreground are the two vacuum pumps (compressors) direct-connected to 30-hp. motors. In the background is the 8- by 20-ft. water scrubber tank in which the dust is washed out of the gas.

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With a W-C Conveyor-Scale System incorporated in your process scheme, you can have up-to-minute thru-put data at any point from incoming transfer to inventory stock-pile. This data, expressed in terms of weight per unit of time, can be totalized for inventory records, process programming, or other manufacturing and accounting functions.

W-C Conveyor-Scale Systems can be supplied for flat or trough-type belts, fixed or variable speed, in capacities from 20 to 1000 tons per hour for new or existing conveyor installations. Each is a job engineered system employing standard, unitized components. As a result, you get a "custom" system at an "off-the-shelf" cost.

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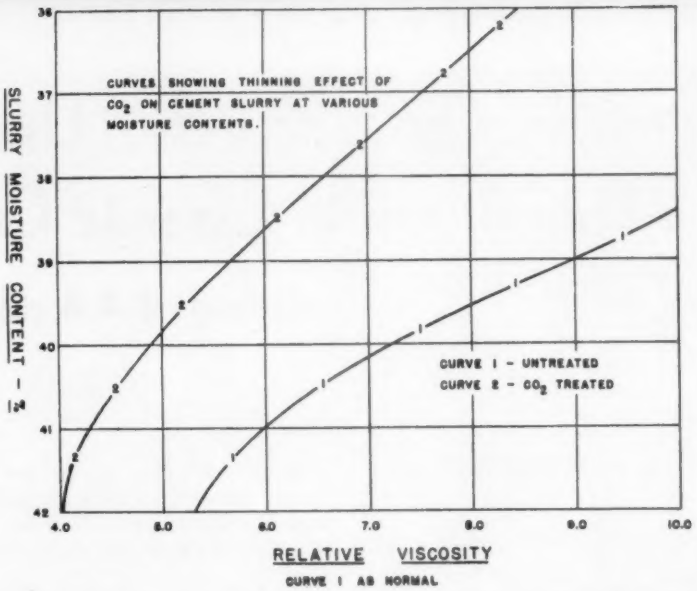
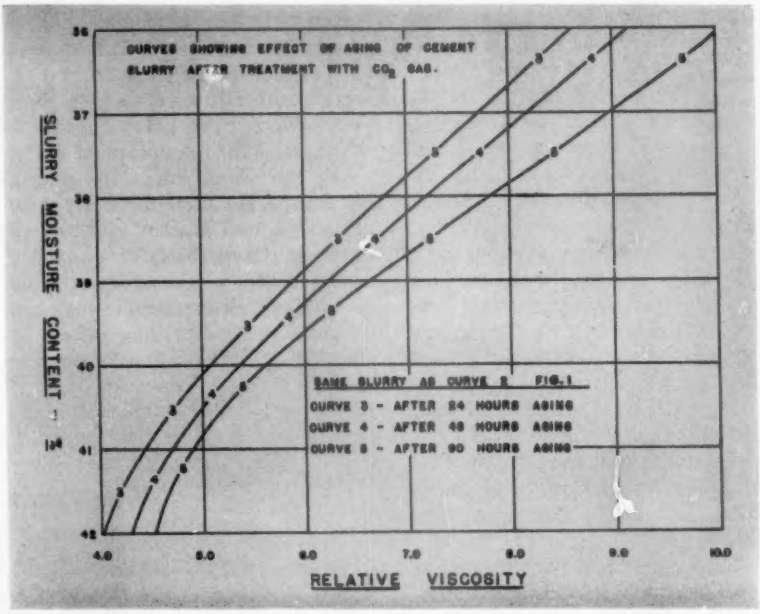
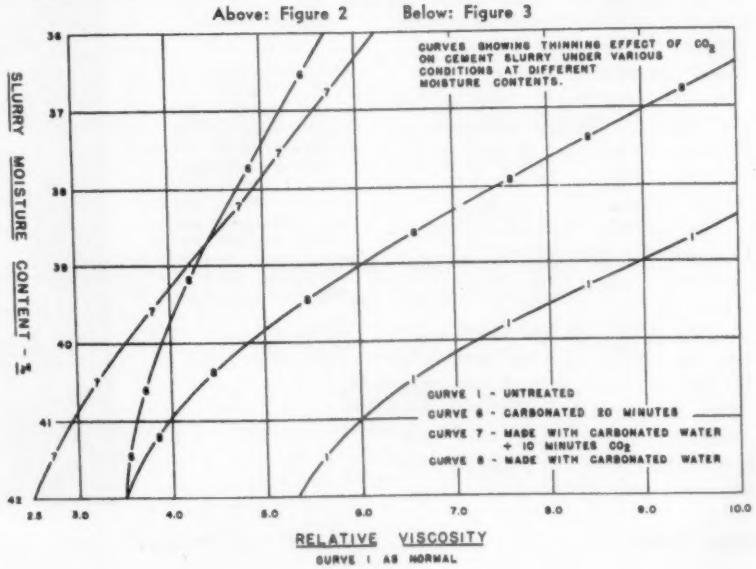
Enter 192 on card, page 257


CURVES SHOWING THINNING EFFECT OF CO_2 ON CEMENT SLURRY AT VARIOUS MOISTURE CONTENTS.
CURVE 1 - UNTREATED
CURVE 2 - CO_2 TREATED
SLURRY MOISTURE CONTENT - %
RELATIVE VISCOSITY
CURVE 1 AS NORMAL


CURVES SHOWING EFFECT OF AGING OF CEMENT SLURRY AFTER TREATMENT WITH CO_2 GAS.
SAME SLURRY AS CURVE 2 FIG. 1
CURVE 3 - AFTER 24 HOURS AGING
CURVE 4 - AFTER 48 HOURS AGING
CURVE 5 - AFTER 90 HOURS AGING
SLURRY MOISTURE CONTENT - %
RELATIVE VISCOSITY

Above: Figure 2 Below: Figure 3


CURVES SHOWING THINNING EFFECT OF CO_2 ON CEMENT SLURRY UNDER VARIOUS CONDITIONS AT DIFFERENT MOISTURE CONTENTS.
CURVE 1 - UNTREATED
CURVE 6 - CARBONATED 20 MINUTES
CURVE 7 - MADE WITH CARBONATED WATER + 10 MINUTES CO_2
CURVE 8 - MADE WITH CARBONATED WATER
SLURRY MOISTURE CONTENT - %
RELATIVE VISCOSITY
CURVE 1 AS NORMAL

Opposite page, top: Figure 1

off at the feed end of the kiln is a small cyclone for primary dust removal, followed by an 8-ft. diameter by 20-ft. high water-scrubbing tank which removes the remaining dust from the gas.

The vacuum pump builds up a gas pressure of about 7 lb.; and after cooling and dewatering in another tank line, the CO_2 is forced into the raw-mill through the feed screw. The 3-compartment Unidan mill is under suction at both ends to carry off surplus gas.

After a year or so of operation, various benefits have resulted. Without the addition of CO_2 in the raw grinding circuit, mill production was about 120 bbl. per hr. of material, 85.9 percent of which passed 200-mesh with 42 percent moisture content. With the introduction of CO_2 in the raw-mill, production has increased to 135 bbl. per hr. of 87.2 percent material passing 200-mesh at 38.5 percent moisture content! And this has been accomplished without any increase in grinding power. (The mill is Symetro-driven by a 600-hp. synchronous motor.)

Burning benefits, with less water to evaporate and a finer-ground slurry, are obvious. Kiln production has gained 109 lb. per day at no increase in fuel, a production increase of about 4 percent. Economic gains break down something like this:

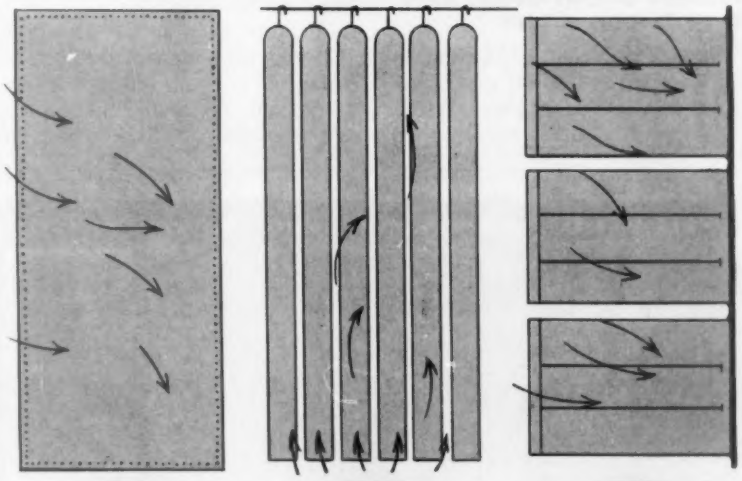
	Cents per bbl.
Saving due to increased grinding capacity	1.0
Fuel saving calculated at 4 percent	1.4
Saving due to increased kiln production	2.4
Gross saving	4.8
Less CO_2 cost per bbl of	0.4
Net saving	4.4

Harold Potter, Laramie plant superintendent, and Duncan Williams, former superintendent, who recently was promoted to a general supervisory post in the main offices in Los Angeles, were largely responsible for the development and employment of the process. Highlights of the experimentation and ultimate adoption were covered in a paper they presented at the 1959 A.I.M.E. meeting.

The process is covered by U. S. Patent No. 2,790,725, and Canadian Patent No. 548,423, and assigned to the Monolith Portland Midwest Co.

SINCE 1870 SLY

SLY DUST FILTERS For LONG BAG LIFE



1900's SLY DUST ARRESTER

Cloth screens on wood frames were rigidly fastened to the dust arrester case, causing strain and excessive wear.

1930's SLY TUBE-TYPE FILTER

Certain areas of cloth tubes, particularly around the cuffs, bore the brunt of incoming dust-laden air, leading to premature failure. Shaking device also contributed to wear.

TODAY NEW SLY "ROLL-CLEAN" DYNACLONE®

"Resist-O-Wear" filter bags have 3-section design for greater strength. Spacer weight is distributed on 3 seams. Bags are cleaned by reverse air.

New Dynaclone Filter Bags Provide 2 to 3 Times Longer Life

New Sly "Resist-O-Wear" bags (patent pending) far outlast other types, as proved on the most demanding applications. In addition to basic bag strength, Dynaclone construction and low-velocity design insures even distribution of dust-laden air over the entire cloth area . . . there is no dust concentration at certain points. Dust is removed automatically by reverse cleaning air — no shaking, no abrasion.

The Dynaclone operates continuously, 24 hours a day if required. Uniform, constant suction at dust sources results in complete dust collection.

Sly Dust Filters provide 20 to 40% more cloth in a given space than any other type. Space saved means lower installation costs, simplified piping and ductwork.

There are more than 40,000 Sly Dust Filters in use, including over 1,000 Dynaclones. Investigate their advantages on your applications . . .

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World-wide Cement News

Sweden's Cement Output Rises By 14 Percent in 1959

Sweden's cement production in 1959 totaled 2,820,000 tons, compared with 2,490,000 tons in 1958, according to a survey made by the business weekly *Finanstidningen*. The output was largely adjusted to meet the demand, and stocks showed only a slight rise during the year, from 210,000 tons to 240,000 tons.

Home consumption of cement rose considerably to 50 to 60 percent of the total production.

Exports went up 25 percent to 225,000 tons, most of the increase being due to a non-recurring delivery to Poland. A considerable part of exports went to the Middle East, one of Sweden's traditionally most important markets for cement, and some quantities were also shipped to the United States.

Anglo-Canadian Cement Ltd. Acquired by Lafarge Cement

Transfer of stock and preferred shares of Anglo-Canadian Cement Ltd. (a ready-mix producer) to Lafarge Cement of North America in Vancouver, B. C., marked the finalization of negotiations in progress for some time. The transaction was made through a Lafarge subsidiary, Lorraine Ready Mix Ltd. Lafarge acquired Deeks-McBride Ltd. of Vancouver (another ready-mix firm) last April.

Assets of Anglo-Canadian include 34 truck-mixers, three batching plants, and a gravel pit. The sale price was reported to be under $1,000,000.

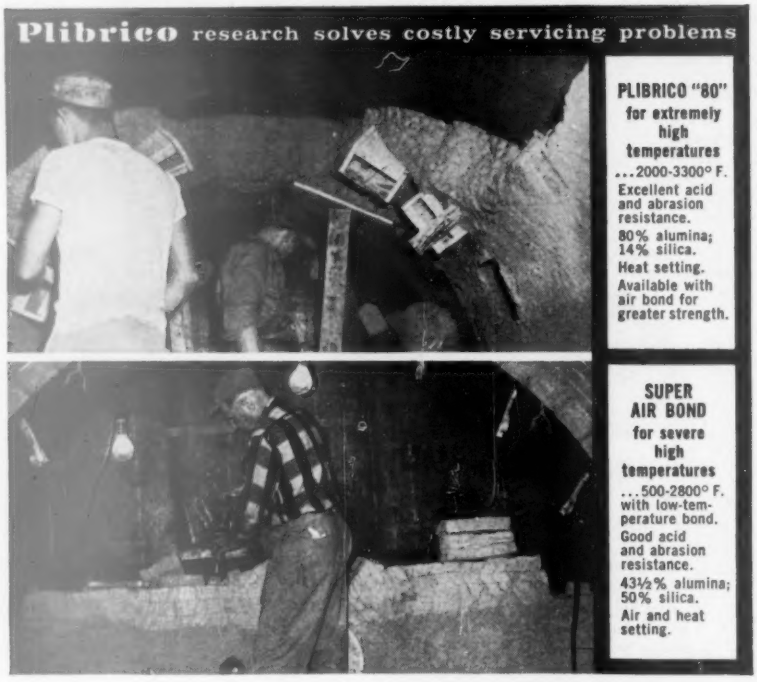
United Kingdom Cement Industry Enjoys Rising Production, Sales

The United Kingdom portland cement industry recently delivered in the home market its biggest weekly total—286,000 tons. The London *Financial Times* reports that this figure was 15,000 tons more than the previous highest week on record.

The total of home deliveries in the present year to date (May 10) is 8.5 percent above the same period of 1959. Cement production during March—the latest month for which full figures are available—reached a weekly average of 249,400 tons, compared with 225,200 tons per week in the previous month.

Green Island Cement Company, Hong Kong, has accepted delivery of a 1,136-ton rotary cement kiln, manufactured by Ube Industries, Ltd., Tokyo. It is the first such unit to be exported from Japan. The kiln cost $150,000 and has a capacity of 250 metric t.p.d.

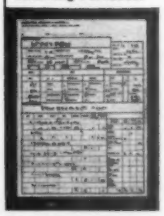
Cape Portland Cement Company, South Africa, recently held the official opening of its new £2,500,000 ($7,000,000) cement mill at Riebeeckwest. The plant had already begun operations; estimated yearly output is set at 4,500,000 bags. The plant layout provides for an expansion to triple this capacity.


Plibrico research solves costly servicing problems
PLIBRICO "80" for extremely high temperatures ...2000-3300° F. Excellent acid and abrasion resistance. 80% alumina; 14% silica. Heat setting. Available with air bond for greater strength.
SUPER AIR BOND for severe high temperatures ...500-2800° F. with low-temperature bond. Good acid and abrasion resistance. 43½% alumina; 50% silica. Air and heat setting.

New plastic refractories take MORE PUNISHMENT in dryers, kilns, hoods, furnaces

These new refractories are designed especially to lower maintenance costs in cement, lime and gypsum plants. They form a continuous joint-free lining, even around contours, which prevents penetration of dust and chemicals which cause early deterioration. And you save the cost of special shapes.

Castable & Plastic Refractories, Ramming Mixes...for Drying, Processing & Calcining Furnaces.



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3,000-Bbl. P.D. Cement Plant Being Built in Philippines

Construction has begun on the Mindanao Portland Cement Company's 3,000-bbl. per day cement plant at Iligan City, Mindanao, in the Philippines. A $2,500,000-contract for basic equipment was awarded to Fuller Company, Catasauqua, Pa., a subsidiary of General Transportation Corporation. Turnbull, Inc., Dallas and Cleveland, is the design engineer for the project.

Equipment items include the following: an Airslide conveying systems, a Fuller-Humboldt suspension type preheater, an Airmerge quadrant blending system, a horizontal grate cooler, Traylor raw- and finish-grinding ball mills, a Traylor rotary kiln, and Dracco multibag dust collectors.

Ceylon's Cement Output To Be Upped 330,000 T.P.Y.

Two major projects have been initiated by the Ceylon Cement Corporation—expansion of the plant at Kankessanturai, near Jaffna, and the erection of a producing and distribution center at Galle.

The expansion at Kankessanturai will increase output from 80,000 to 230,000 tons per year. Cost of this project will be $8,000,000.

At Galle there will be a plant producing 100,000 tons per year.

New Cement Test Standard Issued by Union of S. Africa

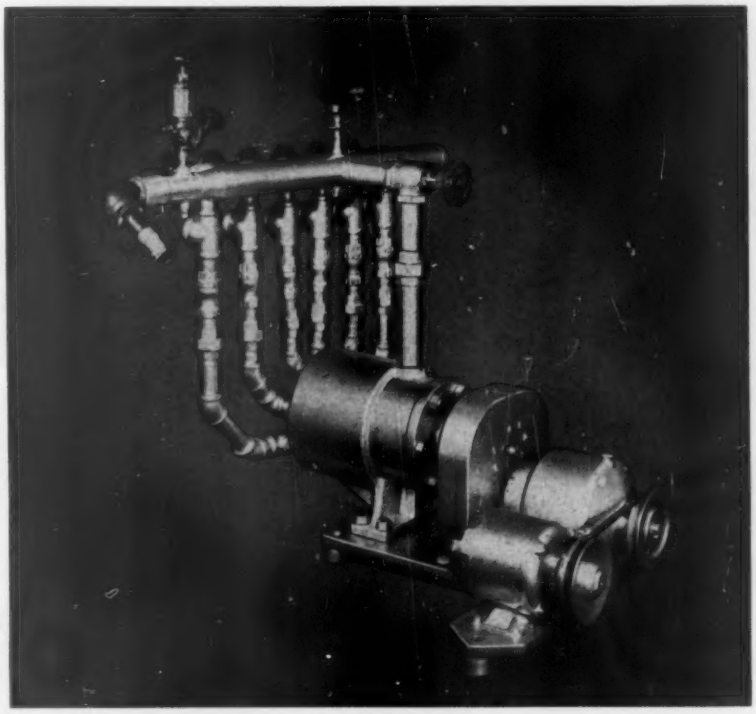
A standard applicable to portland cement manufactured in the Union of South Africa has been published by the South African Bureau of Standards. This new standard will ensure that the consumer obtains the same high quality of cement as that tested against the previous (British) standard.

The Bureau of Standards, in collaboration with four industrial laboratories, is also conducting tests to find an appropriate South African standard sand to be used in cement strength tests. Such a material would replace the Leighton Buzzard sand used at present, which must be imported from England.

Cement consumption in Switzerland totaled 2,295,778 tons from January to October, 1959—an increase of 22 percent over the same period in the previous year. A general boom in construction activities was credited for the increase, and enlarged plant capacity permitted prompt filling of orders. Exports up to the end of September amounted to 0.8 percent, imports likewise 0.8 percent.

During the first three months of 1960, cement production in Turkey amounted to 381,175 metric tons. This is an increase of *86 percent* over the 204,822 tons recorded for the first three months in 1959. According to one source, Turkey's annual cement output now has risen from 395,000 metric tons in 1950 to 1,960,000 tons.

Maritime Rock Products Ltd., a newly formed Canadian company, has a mining and crushing operation near Antigonish, N. S., where material will be recovered near the top of a small mountain on the tide water. Transportation costs of crushed rock will thus be materially reduced.



MANITOWOC CENTRAL CONTROL VALVE FOR SLURRY AGITATORS

The Manitowoc Central Control Valve is a self-contained, fast acting unit complete with air manifold and valve drive. Shown above is a motor-driven central control valve regulating air supply to six slurry agitators. It can be timed with great precision to suit any desired operating cycle and any electrical current characteristic. The entire unit is mounted on a common bed plate with driving mechanism fully enclosed and automatically lubricated.

The Manitowoc Slurry Agitator is designed to use air on an intermittent cycle—as supplied by the Central Control Valve—as economically as possible, and at the same time employs a unique method of piping that prevents the air line from plugging.

Get complete information on the Manitowoc Central Control Valve, Slurry Agitators and Recuperators for rotary kilns—write today!

MANITOWOC SHIPBUILDING, INC.
(A subsidiary of The Manitowoc Company, Inc.)
MANITOWOC, WISCONSIN

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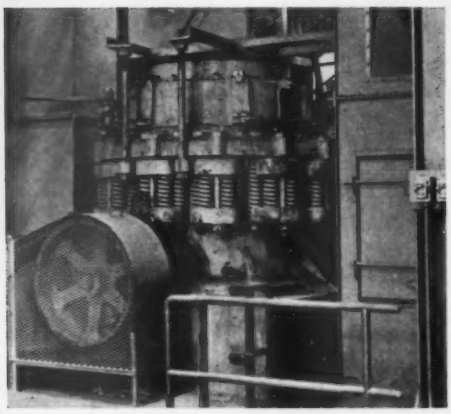
NORDBERG MACHINERY IN THE

One of five 12′ dia. by 36′ Nordberg Two-Compartment Ball Mills, recently installed in a new wet process cement plant. Driven by 2500 hp motors, these are among the largest grinding mills ever built for cement mill service.

Two 11′ dia. by 360′ Nordberg Rotary Kilns installed in a large midwestern portland cement plant.



Typical Symons 4-ft. Short Head Cone Crusher installed for the economical reduction of cement clinker.

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CEMENT INDUSTRY

For over 30 years, Nordberg machinery has been specified by leading producers in the cement industry because of its ability to assure maximum, continuous production at low operating and maintenance cost.

The extensive line of dependable Nordberg cement mill machinery includes Symons® Primary Gyratory Crushers for primary breaking of raw materials; Symons Standard and Short Head Cone Crushers for the preparation of fine, uniformly sized raw mill feed; Symons Vibrating Grizzlies and Screens for scalping and sizing; Nordberg Grinding Mills for wet and dry grinding in ball, tube and compartment types; and Rotary Kilns and Dryers.

For dependable, low cost power, a complete line of Nordberg engines, in sizes to more than 12,000 hp are available to meet practically any cement industry power requirement.

If you are looking for ways to increase operating efficiency and lower production costs, it will pay you to investigate the advantages of Nordberg machinery and the technical engineering services available.

SEND FOR CEMENT BROCHURE

This brochure illustrates the full line of quality Nordberg machinery designed and built for more efficient cement plant operation. Write for your copy today.

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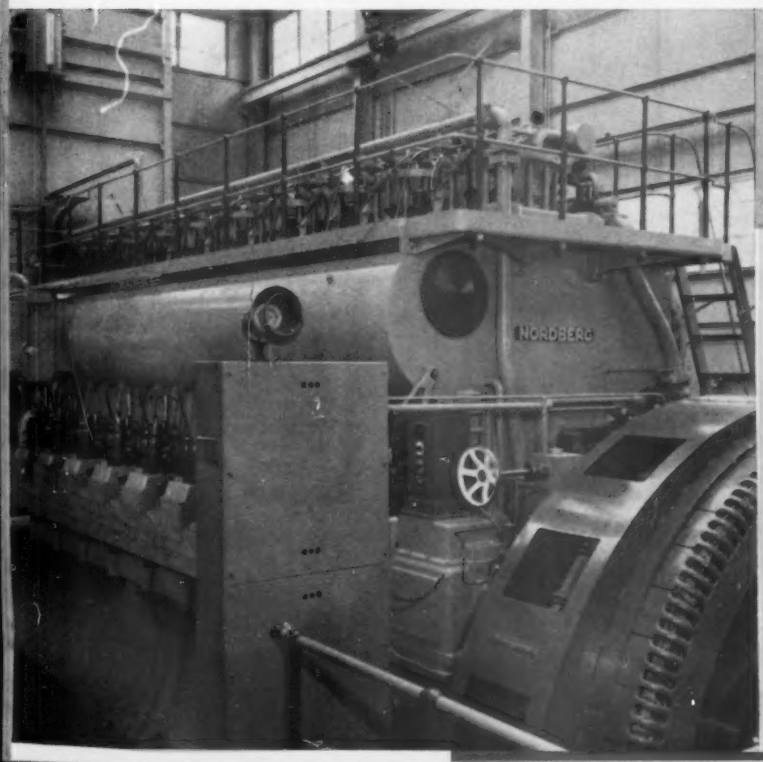
SYMONS . . . *a registered Nordberg trademark known throughout the world.*



This Nordberg Duafuel® Engine, rated 4425 bhp, 3150 kw, furnishes dependable power for a prominent cement plant in Texas.

Symons Rod Deck Screens like this 5-ft. by 8-ft. unit give many cement plants low per ton screening costs.

New conical design...easily converts to liquid cement trailer

The vessel of this versatile new Trailmobile was designed and manufactured by the Delta Tank Manufacturing Co., which has earned an enviable reputation as producers of dependable pressure vessels.

TR-864

Trailmobile pneumatic unit is also stronger, lower and up to 22% lighter than before.

pressure tank

A basic change in shell design—which in effect is two cones joined at the center—gives this radically different Trailmobile all the features you need for top profit performance. For example, you'll find that . . . It's lighter! The use of nylon pneumatic mats in place of steel slope sheets and an exterior ring shell that's *all* cargo space substantially reduce weight and height without sacrifice of capacity. It's stronger! The absence of weak, flat surfaces in the round exterior ring shell provides sufficient strength for higher operating pressures and permits a wider range of cargos. Tested at 65 PSI, the new tank will operate safely at 25 to 30 PSI to give faster delivery where needed and delivery ranges up to 250 feet. It's faster! Pre-pressuring of tank permits the operator to reach full delivery rate in less than 90 seconds from start of blower. Competitive units of the old design require up to ten minutes of "valve manipulating" to reach the desired material pressure ratio. Many loads of 100 barrels or more are delivered from trailer to storage silo in 18 to 20 minutes. It's convertible! By simply replacing dome covers and discharge pot with their liquid counterparts and removing the mat inside, you can quickly convert to a liquid carrier of single compartment, clean bore design. This requires considerably less time and cost than competitive units and almost doubles the profit capacity of the trailer. Resale value is also greatly enhanced. Ideally suited for liquids! Double conical design offers specific advantages for liquid hauling, too. The circular cross-section gives maximum strength for hauling of liquids under pressure. It also provides greater capacity within smaller outside dimensions. And the conical shape lends itself to gravity discharge and better clean-out of high viscosity liquids. Why not enjoy these matchless advantages in your operations. A call to your nearest Trailmobile office is a good way to start.

TRAILMOBILE INC.

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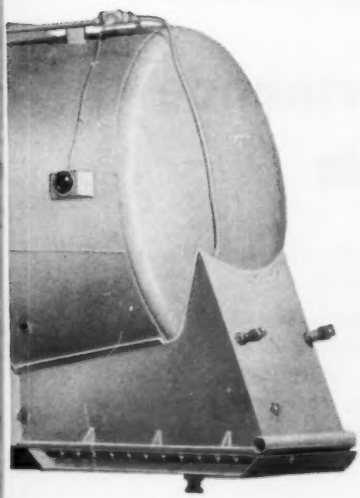
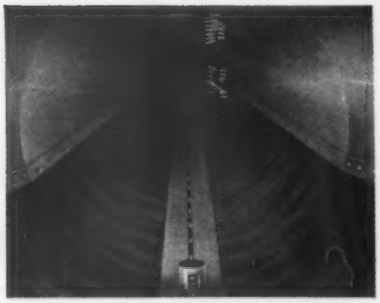
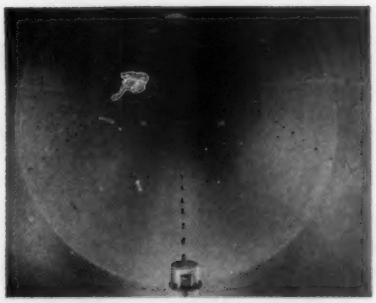




Interior view (from discharge pot forward) shows arrangement of pneumatic mats in cement trailer.



When these mats are removed, the unit becomes an ideal single compartment, clean bore liquid carrier.

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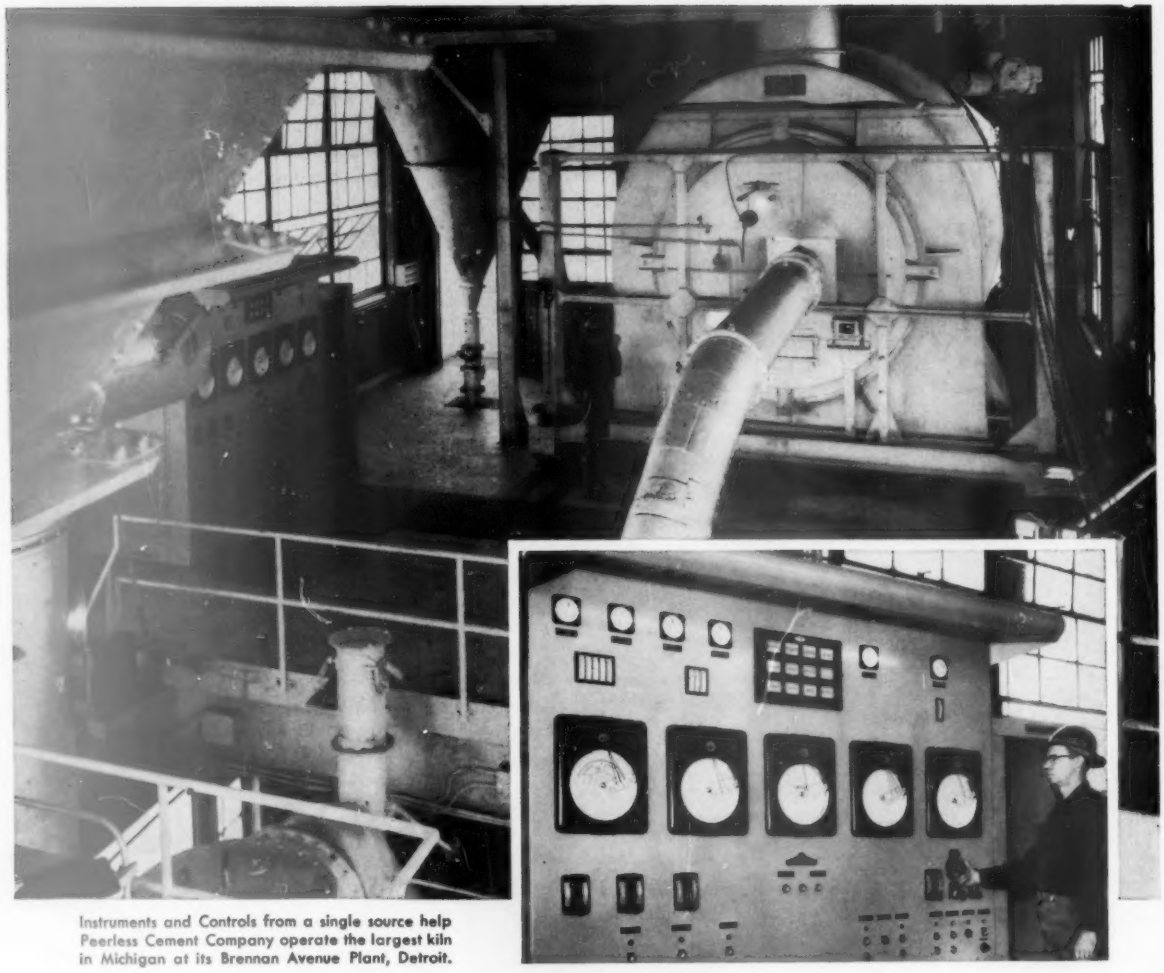

Instruments and Controls from a single source help Peerless Cement Company operate the largest kiln in Michigan at its Brennan Avenue Plant, Detroit.

This giant kiln gives peak performance longer with Bailey Controls

The Peerless Cement Company of Detroit demands maximum capacity, uniform production and low fuel rate from its largest kiln . . . and Peerless gets it!

They do it with a Bailey Control System that gives them complete control of combustion, clinker cooler, and other kiln variables.

The system keeps continuous chart records of 11 important variables, including temperatures, drafts, air flow, kiln speed, fan speed, % oxygen, and % combustibles.

All this is done so dependably that the kiln often makes week-long runs without being touched.

All recording receivers in the Bailey System are plug-in components—easily removed, regrouped, or replaced to meet changing requirements. Additional records are added simply by plugging in receivers on existing recorder cases. Your Bailey Engineer can help you plan for peak performance — call him or write for your Bailey Kiln Control Folder.

C115-1

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THE GREAT NEW NAME IN EXTENSIBLE KRAFT

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You can also buy Expanda-Kraft in Semi-Bleached or Natural. Imagine how attractive *your product* would look, packaged in Expanda-Kraft.

To learn how well your product can be *protected* by Expanda-Kraft, see other side . . .

EXPANDA-KRAFT

DEFIES SHOCK!

The bullet passes of Johnny Unitas have the terrific impact to rip through regular kraft (above), yet, thrown at the same speed, they bounce off Expanda-Kraft because of its greater resiliency (left). Johnny Unitas, all-pro quarterback of the Baltimore Colts, demonstrated the toughness of Expanda-Kraft at the National Packaging Show in Atlantic City. Each target consisted of four plies of 50-lb. basis weight stock. Time after time, in standard drop tests, bags made of Expanda-Kraft have proved their superior strength.

EXPANDA-KRAFT REDUCES BREAKAGE It has *two-way stretch*, soaks up shocks that would break ordinary kraft of equal basis weight.

EXPANDA-KRAFT WITHSTANDS MOISTURE *High humidity* and *weathering* have little effect on Expanda-Kraft! It retains its full toughness and firmness.

EXPANDA-KRAFT PRINTS SHARP This advertisement is printed on 50-lb. Expanda-Kraft White from a regular production run. Other shades print as well to enhance sales appeal.

EXPANDA-KRAFT BAGS STACK SECURELY They have a coefficient of friction higher than regular kraft bags, stack with less risk of slippage, stay in place while in transit.

EXPANDA-KRAFT BAGS FILL FAST They meet required porosity standards, yet are rigid enough to stand up to high speeds on the filling line.

Expanda-Kraft is the winner in impact test against regular kraft. Bags of each type were filled with sand, suspended on long ropes, sent hurtling toward each other. Regular kraft bag, photographed at high-speed as it burst, had same ply construction as Expanda-Kraft bag.

CONTACT YOUR MULTIWALL BAG SUPPLIER for information on the use of Expanda-Kraft where rigidity, resilience, strength, moisture resistance and uniformity are required. Expanda-Kraft is made by a new roll-crepe process and is available to multiwall bag manufacturers in 40, 50, 60, 70 and 80-lb. basis weights; White, Semi-bleached or Natural. *Hollingsworth & Whitney, Division of Scott Paper Company, Dept. G, Chester, Pa.*

HOLLINGSWORTH & WHITNEY DIVISION OF
SCOTT PAPER COMPANY

Ni-Hard mill liners save dollars for cement-plant operators

Twelve years ago a large cement company installed Ni-Hard* nickel-chromium white iron liners in their No. 2 dry-grinding mill.†

They are *still* in excellent shape.

What's more, the plant estimates that they're good for at least *another* 10 or 12 years' service. So it's no wonder they've put Ni-Hard liners into two more mills!

High Abrasion Resistance

Try Ni-Hard iron alloy in *your* mills. It is unlike other cast irons. Not only is its structure as hard as that of fully hardened steel, but it contains firmly embedded hard carbides which help to make it *one of the most abrasion-resistant cast products commercially available to you.*

Ni-Hard liners often double or triple the interval between mill relinings. And Ni-Hard liners often hold their original contour right down to the last quarter-inch!

Minimize Needless Shutdowns

Next time you reline a mill, try this nickel-chromium white iron. Ni-Hard liners can be produced in practically any design to meet your individual grinding requirements. And segments can be fastened by any commonly used method. Try a set and see for yourself how they give you maximum abrasion resistance at lowest ultimate cost.

Valuable Booklet Tells More

Every plant operator who ever faces an abrasion problem should have a copy of *"Engineering Properties and Applications of Ni-Hard."* This 60-page, illustrated booklet gives you all the facts about Ni-Hard iron performance and suggests where and how to use it for best results. We'll send a copy on request. But for really fast action, just get on the phone and call your local Ni-Hard producer. (If you don't know his name, ask us.) He'll answer your every question about long-wearing, abrasion-resisting Ni-Hard iron.

*Registered trademark
†Name and details supplied upon request.

THE INTERNATIONAL NICKEL COMPANY, INC.
67 Wall Street INCO New York 5, N. Y.

NI-HARD

NICKEL MAKES ALLOYS PERFORM BETTER LONGER

NEW $25,000,000 PLANT TO PRODUCE 5 MILLION BARRELS OF CEMENT PER YEAR.

NICHOLSON was prime contractor for this progressive cement plant.

NICHOLSON builds and engineers for the cement industry.

THE NICHOLSON CO.

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Limited quantities still available!

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PIT and QUARRY'S *Comprehensive* PORTLAND CEMENT PLANT MAP

Here is all of North America in a single map to provide the best available source for the following information—

- name and location of portland cement producing and distributing plants
- name and location of grinding plants and plants now under construction
- type of process used by each plant
- plant capacities in bbl/year
- brand name of cement produced

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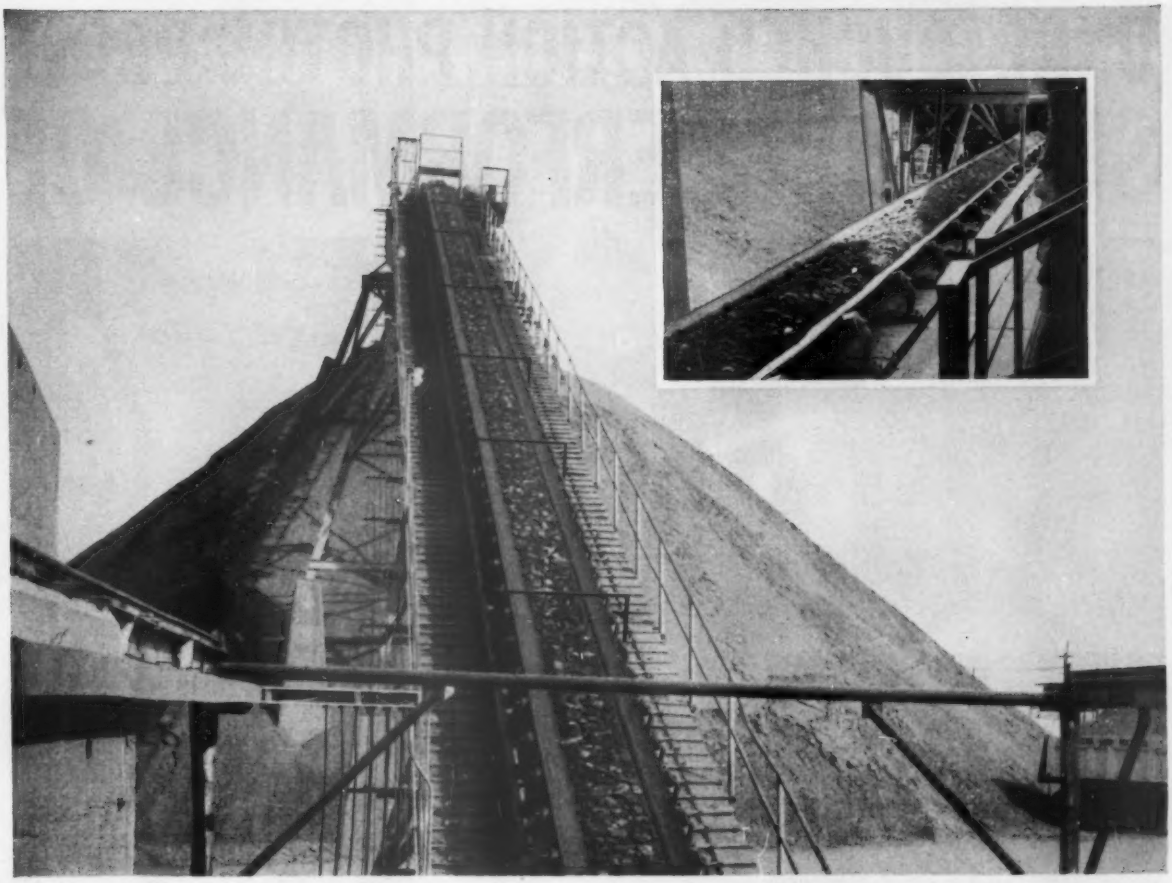
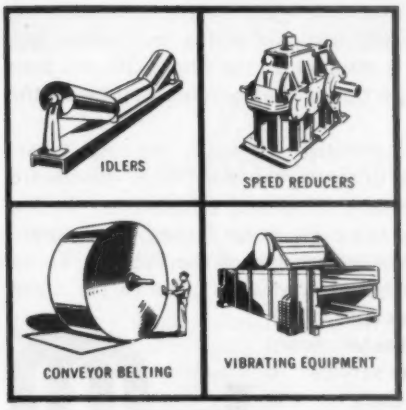


How's this for troughing?



These unretouched photos, taken at the Arizona Sand & Rock Company plant in Phoenix, show what quality Hewitt-Robins belt conveyor idler construction means. The precision troughing will result in longer belt life, higher delivered tonnages, and reduced maintenance during the entire life of the conveyors. Throughout the aggregates industry, operators benefit from Hewitt-Robins . . .

- **Conveyors**—sectional (from stock).
- **Belts**—in a wide variety of constructions.
- **Idlers**—standard, heavy duty, cushion, and flexible rubber spiral types.
- **Vibrating Equipment**—only H-R manufactures all four types of screens; a complete line of feeders, foundry and car shakeouts.
- **Screen Cloth**—in many meshes, designs, and materials.
- **Speed Reducers**—one of the most comprehensive lines in industry.

The quality and dependability you'll find in Hewitt-Robins conveyor idlers are built into all H-R bulk materials handling equipment. For full details consult your H-R representative, or write Hewitt-Robins, Stamford, Connecticut. Ask for Bulletin 7-24.

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THE NAME THAT MEANS EVERYTHING IN BULK MATERIALS HANDLING SYSTEMS . . .

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UNRETOUCHED ACTION PHOTOS PROVE SUPERIOR PERFORMANCE OF BUELL CYCLONES

an ordinary cyclone

THE BUELL CYCLONE
with Shave-Off

These are photographs of as true a test as can be made under laboratory conditions. Notice the difference in the dust patterns! In the Buell Cyclone, on the left, the dust at the top makes less than one revolution before it is trapped by the Shave-Off. It's then channeled down to the lower portion of the Cyclone, well below the clean gas outlet.

Why is the Buell Shave-Off so effective? Primarily because it harnesses the double-eddy current to convey the dust "fines" downward quickly, thereby promoting greatly increased efficiencies. In the ordinary cyclone, as shown on the right, these "fines" concentrate and recirculate at the top, causing ercsion of the cyclone. To be collected, the fine dust must travel downward close to the clean gas outlet where much of it escapes. Buell Cyclones have made an impressive record in many years of trouble-free service. To see how their extra efficiency in the Shave-Off can pay off for you, send for our Cyclone Catalog #103. The Buell Engineering Co., Inc., 123 William Street, New York 38, New York. Northern Blower Division, 6404 Barberton Avenue, Cleveland, Ohio. (Subsidiary: Ambuco Ltd., London, England.)

buell
Norblo

CYCLONES • ELECTRIC PRECIPITATORS • BAG COLLECTORS • COMBINATION SYSTEMS • FANS • CLASSIFIERS

Photographed on location by Jack Beech.

Guesstimation or Automation?

While automation makes money for progressive manufacturers, others still operate on intuition and "guesstimation."

The result? Some portland cement buyers are finding variations in quality—and many producers are noting wide variation in profits.

There probably is no more economical way to meet the requirements of your customers for high quality cement . . . no better way to meet demands for bag-to-bag uniformity . . . no faster way to modernize and compete in today's market . . . than with accurate and dependable measuring and control systems by Leeds and Northrup, *the most experienced* supplier of instrumentation to the portland cement industry.

Don't depend on "guesstimates," *be sure*. Let your L&N Field Engineer review your process and problem. Let him suggest from the wide range of L&N products, the *right* system to improve your product and process. Call him at your nearby L&N office or write 4907 Stenton Avenue, Phila. 44, Pa. Ask for our booklet, "Modern Practices in Rotary Kiln Instrumentation."

LEEDS LN NORTHRUP

Instruments Automatic Controls • Furnaces

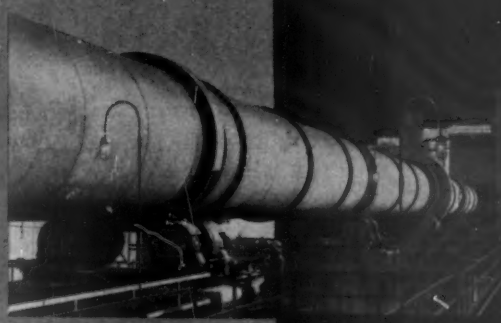
KENN

FOR IMPROVED CAPACITY,

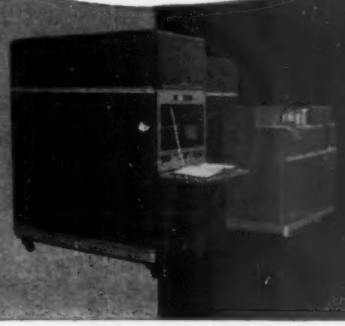
KENNEDY STONE PREPARATION MACHINERY

Jaw crushers—Blake and Overhead Eccentric types — Impact breakers, primary and secondary gyratory crushers, screens and conveyors — each noted for its dependability—can be integrated for the balanced output of correctly graded stone sizes.

KENNEDY ROTARY KILNS

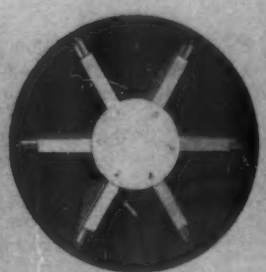


New standards of kiln performance and economy derive from KENNEDY's new, exclusive digital computer analysis of rotary kiln processes, and from KENNEDY's many years of experience in designing and manufacturing kilns for the cement industry.



KENNEDY INTERNAL HEAT RECUPERATOR

The "MULTIVANE" design of alloy steel vanes provides maximum transfer of heat and movement of material. The result is substantial saving in fuel—as high as 15%! Can be supplied for installation in existing kilns with a minimum of downtime.

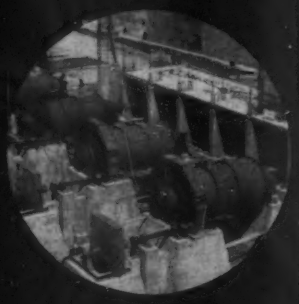


EDY

CEMENT PLANT MACHINERY

ECONOMY, PERFORMANCE

KENNEDY GRINDING MILLS



KENNEDY mills are distinguished for high capacity, dependable performance, low operating cost and minimum maintenance. Used for grinding raw material (wet or dry) and clinker and pulverizing coal for firing rotary kilns.

KENNEDY PNEUMATIC CONVEYING SYSTEMS

THE AIR-GRAVITY CONVEYOR

The exclusive porous tile conveying surface makes Air-Float the preferred, proven method for moving dry, pulverulent materials horizontally.

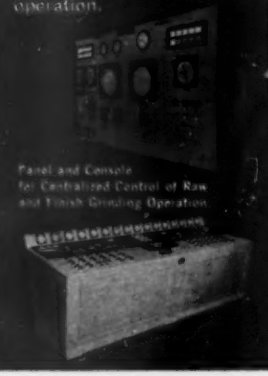
KENNEDY PNEUMATIC PUMPS

convey more material through smaller pipelines. There are no motors, no feed screws nor other moving parts while conveying.

KENNEDY CENTRALIZED EQUIPMENT CONTROL

Control Cubicle for Rotary Kiln and Auxiliaries

All instruments essential to the system control are housed in a single, attractive cubicle, panel or console. Each is factory-assembled and checked to simplify installation and insure efficient overall operation.



Panel and Console for Centralized Control of Raw and Finish Grinding Operation

KENNEDY cement plant equipment has won an enviable reputation for improving the capacity, economy and overall performance of cement plants all over the world.

This accomplishment is no accident!

KENNEDY knows cement! KENNEDY's staff of cement specialists has a long record of successes in designing and building equipment for cement plants. The KENNEDY manufacturing plant is the most complete of its kind enabling production of machinery of the highest quality.

KENNEDY's position as a leader in this field is easily demonstrated. We welcome your request for specific examples of KENNEDY's successful installations.

KVS

KENNEDY VAN SAUN

Manufacturing & Engineering Corporation

405 Park Avenue
New York 22, N. Y.
Factory: Danville, Pa.

NEW!

WEST VIRGINIA'S 1960 STANDARD BAG CONSTRUCTIONS TO SAVE YOU MONEY

Substantial savings for cement companies are achieved by two new standard WONDERWALL bag constructions perfected by West Virginia for packing Portland cement.

During a controlled test to determine possible savings in bag costs, various WONDERWALL constructions were developed in our Multiwall Packaging Laboratory. They were tested by 24 plants which shipped 1,118,415 barrels of cement in 5,282,966 WONDERWALL bags.

Result of this laboratory and field proving was the development of the superior "Optimum" and "Economy" bags for packing Portland cement. The new constructions are shown in the box.

The new 3-ply Economy WONDERWALL *is tougher than the 4-ply natural kraft multiwalls in all respects, and offers a cash saving of $2.75 per M in bag cost.*

The 3-ply Optimum WONDERWALL gives far better performance than the heavier 4-ply kraft multiwall, both in the mill and in transit. Whereas natural kraft breakage ran as high as 5% in truck shipments, the WONDERWALL Optimum bag reduced it to less than 1%. Breakage in rail shipments dropped from 6 to 10 bags per car to 1 or 2 maximum. The reduction in bag breakage alone provides a realistic cash saving, to say nothing of improved customer and employee satisfaction.

Secret of WONDERWALL strength is Kraftsman Clupak* extensible paper. Its built-in stretch withstands far more impact without breaking than conventional natural kraft. In a WONDERWALL bag, fewer plies are needed to do the job!

See how WONDERWALL standard bag constructions can cut your costs, increase your profits. Our technical service experts are ready to help you take full advantage of these new bag developments; call or write Multiwall Bag Division, West Virginia Pulp and Paper Company, 230 Park Avenue, New York 17, N.Y.

**Clupak, Inc.'s trademark for extensible paper manufactured under its authority and satisfying its specifications.*

NEW STANDARD WONDERWALL CEMENT BAG CONSTRUCTIONS

Pounds Packed	Old Style Natural Kraft Construction	Optimum Wonderwall	User Benefit
94#	3/40, 1/50	3/50	less breakage

	Economy Wonderwall	
94#	3/40, 1/50	1/50, 1/40, 1/50	$2.75/M and less breakage

WONDERWALL bags of the "Optimum" construction have reduced breakage at the North American Cement Corporation's Security, Maryland, plant.

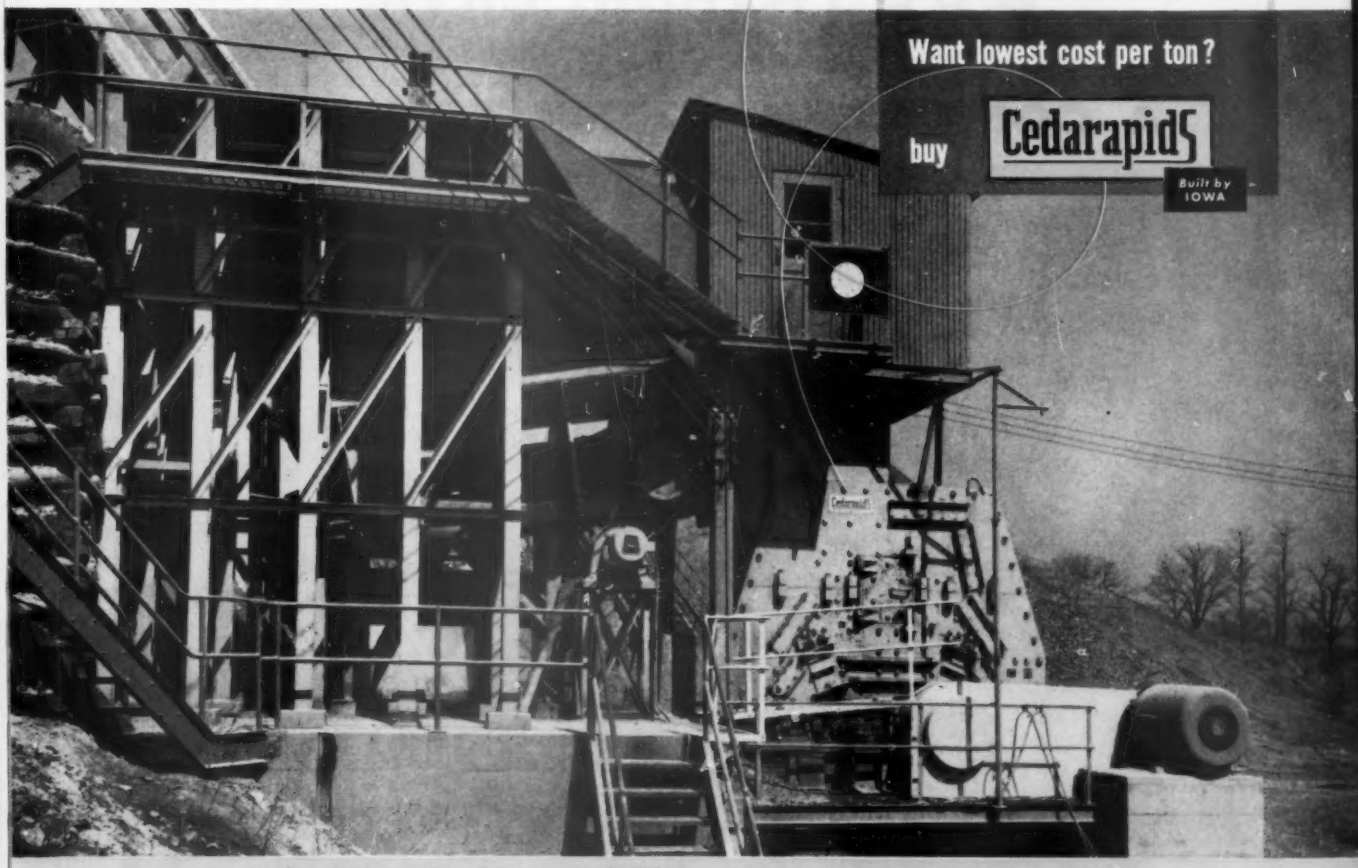
West Virginia Pulp and Paper

Here's why more cement producers prefer
CEDARAPIDS DOUBLE IMPELLER IMPACT BREAKERS

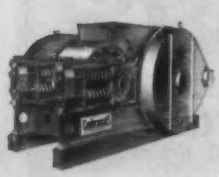
Up to 1000 tons per hour capacity! Six model sizes to choose from ● High 40 or 50 to 1 reduction ratio cuts production costs, reduces need for auxiliary secondary crushers, screens, conveyors, etc. ● Low maintenance and operating costs; rock enters the unit from the highest point to utilize the entire breaking chamber for breaking rock against rock. With 50% less contact of stone against metal, wear on hammers and breaker bars is reduced and horsepower requirements are cut ● These are a few of the many benefit-features of Cedarapids Double Impeller Impact Breakers which help cement producers step up output and cut costs for crushing limestone and shale ● See your Cedarapids Dealer for complete details.

This cement company produces 300 tph, with 80-90% of material being crushed

Crushing high calcite limestone, a prominent Eastern cement producer operated its 4350 Double Impeller Impact Breaker on 8 hour per day shifts. With 80% to 90% of material requiring crushing, the peak production for one shift was 2400 tons! Taking rock up to 43" in diameter, the Cedarapids Breaker reduced it to 3" product in one pass.



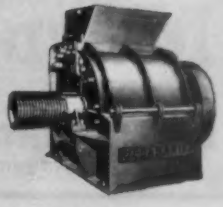
Cedarapids serves the cement industry with a complete line of equipment



ROLL CRUSHERS, in 6 sizes with 3 types of roll shells, insure high capacities of the smaller sized finished product you want.

HORIZONTAL VIBRATING SCREENS provide as much as 12½% greater screening area than inclined screens of the same size. Available in 3' x 8' to 60" x 16' sizes, with double or triple decks.

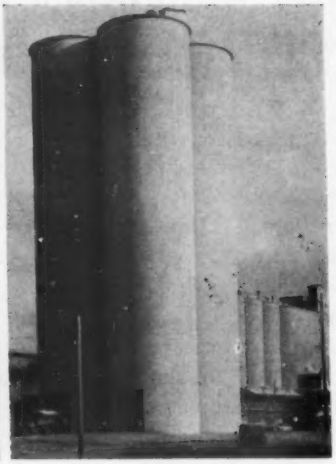
HAMMERMILLS produce a much finer quality of product, and size for size, produce more tons per hour than other similar types of equipment.



IOWA MANUFACTURING COMPANY • Cedar Rapids, Iowa

BESSEMER

PONCE



DIAMOND

BULK LOADING SILOS OR A COMPLETE CEMENT PLANT!

NORTHWESTERN STATES PORTLAND CEMENT CO.

MACDONALD ENGINEERING CO.

22 MADISON ST.

SAN FRANCISCO
149 New Montgomery St.

CHICAGO

TORONTO
181 Eglinton St.

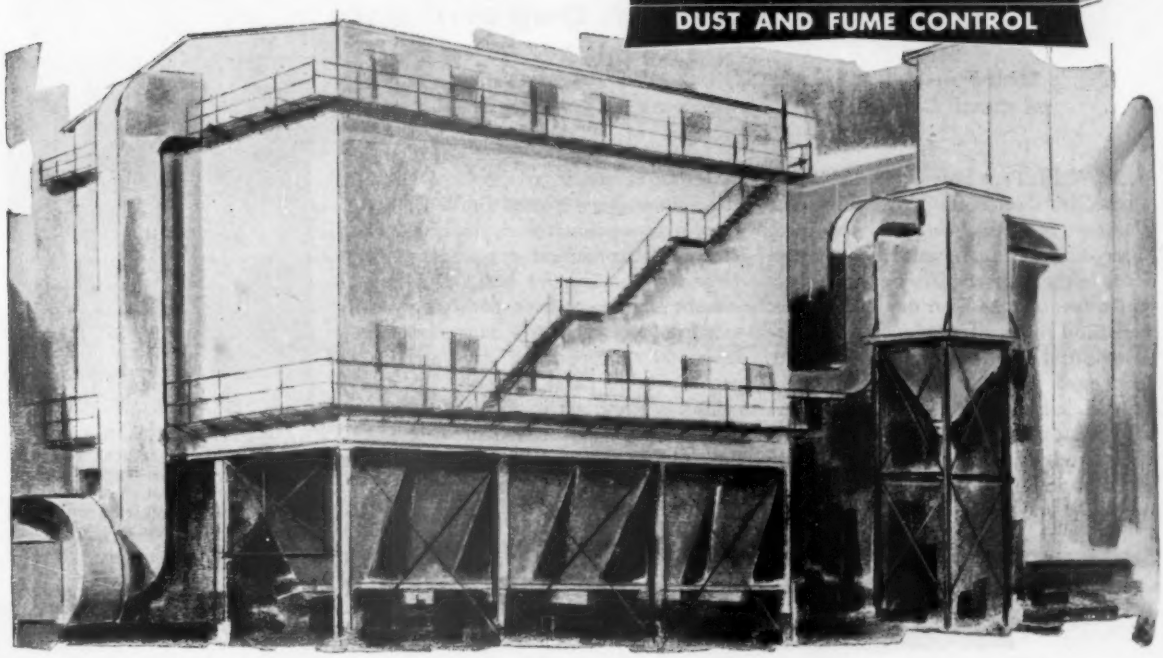
Before you buy a glass baghouse **see what wheelabrator® can do for you**

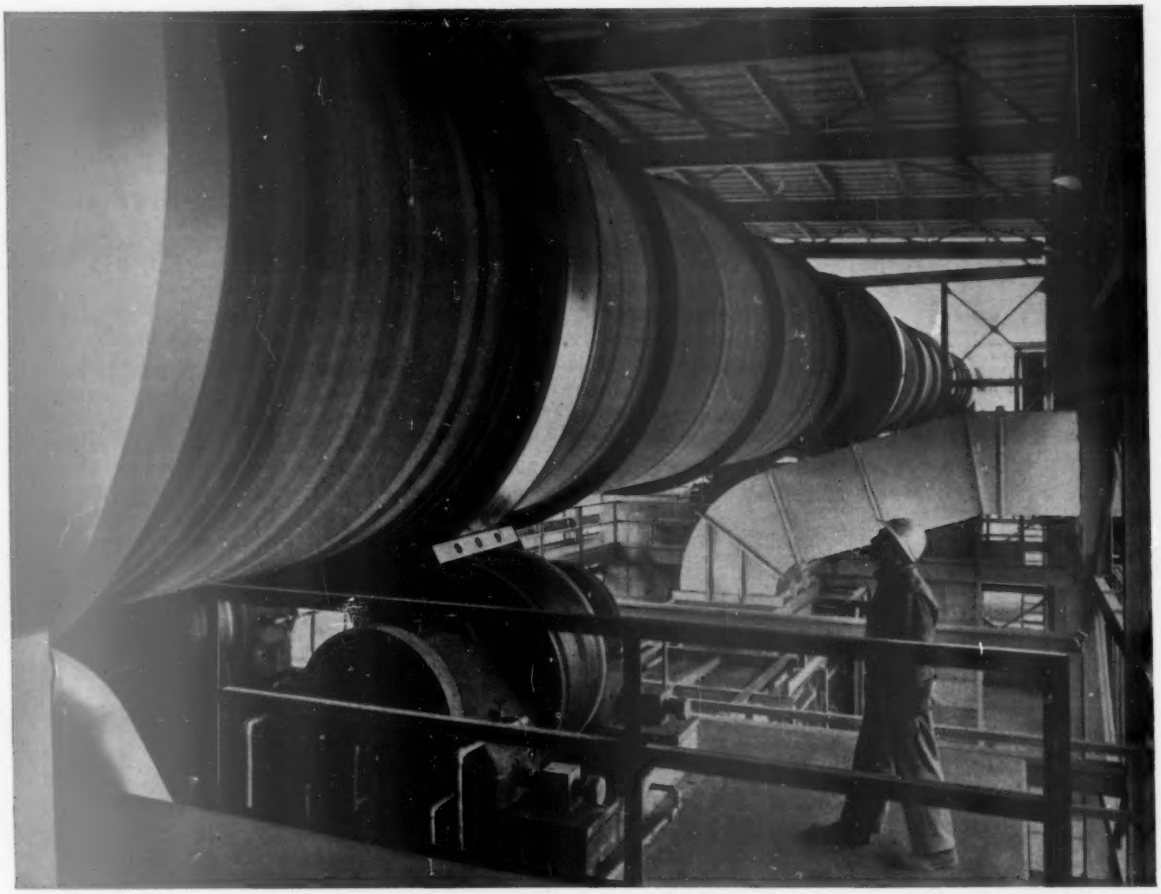
Look at Wheelabrator's record of performance and successful installations collecting hot gases in glass baghouses. Since the first Wheelabrator Dustube® installation utilizing Glastube® filter tubes, made over 7 years ago, Wheelabrator has amassed an unequaled wealth of experience and know-how in designing custom-made baghouses using glass fiber tubes. Today, more than 4 million c.f.m. of hot gases are being filtered in Wheelabrator Glastube baghouses, using either the repressuring or shaking methods of bag cleaning. Wheelabrator Dustube Collectors embody many exclusive features that insure highest efficiency at lowest operating and maintenance costs. Collection efficiencies above 99% are regularly achieved. Input temperatures up to 550°F are accommodated in closed baghouses, and up to 650°F in open baghouses, without costly pre-cooling equipment.

Wheelabrator Dustube collectors offer the most practical solution to your problem of filtering hot gases from dryers, kilns or clinker coolers . . . the most favorable balance of equipment and operating cost to collection efficiency. For engineering consultation, write to **WHEELABRATOR CORP., 1280 S. Byrkit St., Mishawaka, Indiana. In Canada, P.O. Box 490, Scarborough, Ontario.**

Write for this illustrated report of Dustube Collectors serving in many normal and high temperature applications.

WHEELABRATOR
DUST AND FUME CONTROL



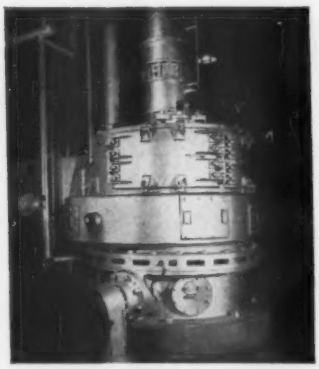


B&W Pulverizer Fires 12 x 450 Ft. Kiln Efficiently, Dependably

Unit Pulverizes from 204 to 216 Tons Daily of Coal Containing as much as 12% Moisture

A B&W EL Type Pulverizer enables the Cape Girardeau Plant of the Marquette Cement Manufacturing Company to direct-fire continually one of the largest kilns in the industry. They operate their pulverizer on a 24-hour day, 7-day-week basis and meet all production requirements. And — after well over two years of rugged grinding service this sturdy pulverizer has never caused an unscheduled plant shut-down.

Throughout the cement and rock products industry, performance records like that turned in at the Cape Girardeau Plant, have earned B&W Pulverizers a reputation for dependable, efficient, and economical grinding service. If you're thinking of building a new cement plant or perhaps modifying your existing facility, a B&W Pulverizer can help you cut operating costs and improve over-all plant efficiency. For the complete story, get in touch with your local B&W representative, or write The Babcock & Wilcox Company, Boiler Division, Barberton, Ohio.



B&W EL Type Pulverizer at Marquette Cement Manufacturing Company has ground an average of over 72,000 tons per year since its installation. No unscheduled shut-downs required for maintenance.

C-220

B&W

THE BABCOCK & WILCOX COMPANY

BOILER DIVISION

HARDNESS IS IMPORTANT

NO. 2 OF A SERIES

Carbex Triple-Forged Grinding Balls are carefully and thoroughly heat treated to attain a uniform hardness to their tough, shock-resisting core, assuring better grinding surfaces, uniform performance, longer and more even wear. These qualities in the Coates Grinding Balls produce extreme hardness for wear, and toughness to prevent breakage under strain of milling.

Coates Carbex Grinding Balls are made of fine-grained, high-carbon steel. Produced by skilled workers according to proved specifications guarded by continuing quality controls, they have earned an international reputation for quality and performance. Call for Coates Carbex Grinding Balls . . . built with care for longer wear.

Write today for prices . . . All sizes—½" to 5" carried in stock for immediate shipment.

COATES STEEL PRODUCTS CO. CARBEX TRIPLE-FORGED BALLS

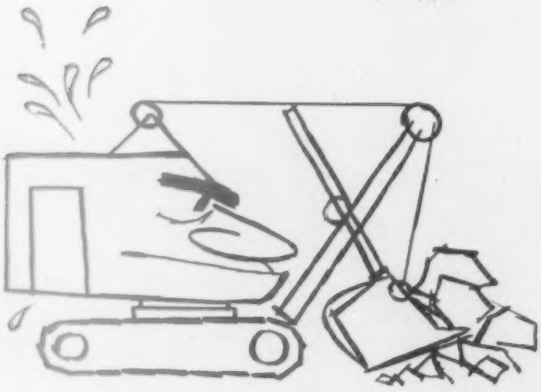
C S S 7-8

COATES

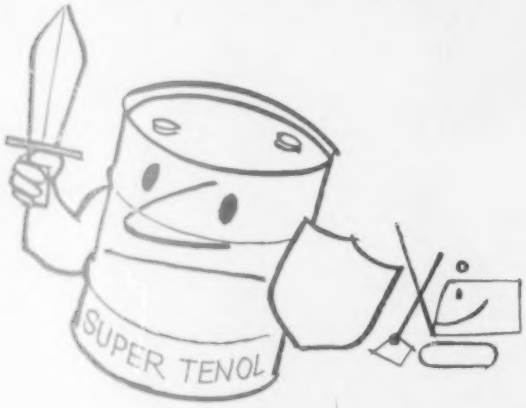
STEEL PRODUCTS COMPANY

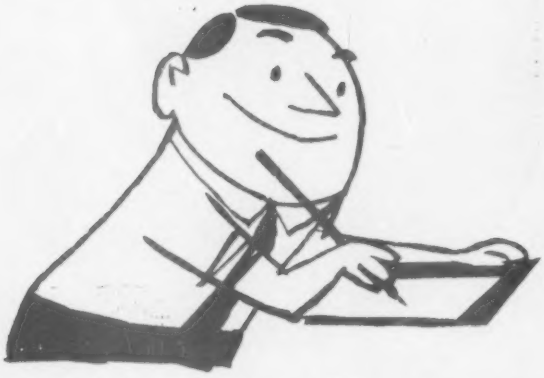
GREENVILLE, ILLINOIS

LARGEST EXCLUSIVE MANUFACTURER OF GRINDING MEDIA



Diesel engines powering heavy equipment in mines and quarries can dish it out day after day. But can they take it...year after year? The record shows they can...when lubricated and protected by Sinclair SUPER TENOL® Motor Oil.





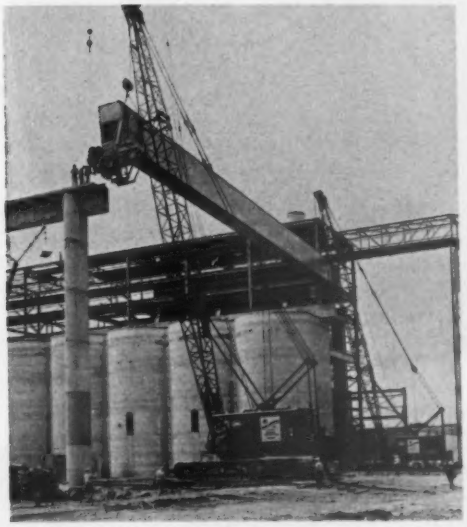
Diesels safeguarded by SUPER TENOL can withstand high temperature and stop-and-run operation...protect vital engine parts from varnish, sludge, rust and acid corrosion. The reason: SUPER TENOL combines high quality base oils with special additives. Put SUPER TENOL to work for you...call your Sinclair Representative or write

Sinclair

SINCLAIR REFINING COMPANY

TECHNICAL SERVICE DIVISION • 600 FIFTH AVE., NEW YORK 20, N.Y.

DARIN & ARMSTRONG BUILDS WORLD'S MOST MODERN PLANT ON SCHEDULE... WITHOUT OVERTIME



6 million barrel capacity plant now producing

A milestone in cement plant construction was achieved with the recent completion of the giant, new Dundee plant.

The design of this plant, incorporating the largest mills and kilns ever installed in this country, plus a concentration of all buildings and equipment in a relatively small area, presented many new and unusual problems.

Darin & Armstrong completed the job as designed . . . on schedule . . . *without overtime.*

If you're planning to build a new plant, or to modernize your present facilities, we'd welcome the opportunity to tell you about our men, our equipment, our ability and our experience in combined building and machinery installation projects.

For Project Report No. 4 see June 1960 issue

◀ Erecting 75-ton girder for storage hall crane at 80' elevation. Lifts such as this, performed with Darin & Armstrong's mobile lifting equipment, contributed to the savings in time and cost of the project.

DARIN & ARMSTRONG, INC.

GENERAL CONTRACTORS

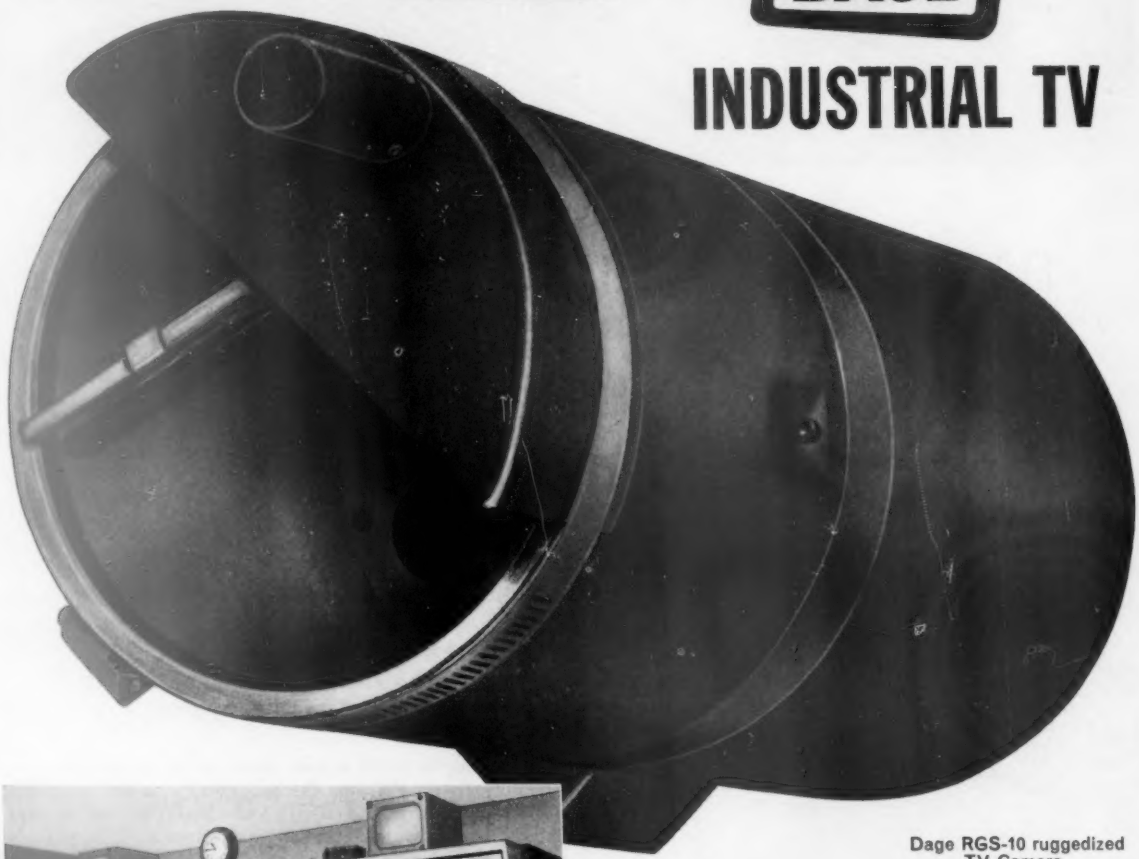
Chicago 38, Ill. DETROIT 38, MICH. Cincinnati 18, Ohio

AUTOMATION WITHIN THE CEMENT INDUSTRY is being assisted by Dage closed-circuit television. At the Oro Grand, California, plant of Riverside Cement Company, Dage TV cameras provide a constant check on rotary kilns. Observers in the process control room are able to control kiln feed and clinker formation by watching two television monitors. The results . . . better quality cement at lower cost.

The ideal closed-circuit installation for rugged industrial use is Dage TV's new RGS-10 system. Consisting of a 700 line resolution camera and camera control, this system is highly applicable for usage in mines, oil refineries, aggregate plants and in other areas of environmental extremes. The RGS-10 camera requires no additional housing; weighs only 15 pounds; has automatic light level compensator; is transistorized with exception of vidicon tube. The camera control will operate 2000 feet from the camera; is completely transistorized; features plug-in modules for easy servicing. The entire system is engineered to rugged military and commercial requirements.

Dage manufactures a complete line of closed-circuit television equipment for industry, the military, research and development, education. Write for literature or request consultation about your application for closed-circuit TV. No obligation of course.

Better Cement at Lower Cost with DAGE INDUSTRIAL TV



Dage RGS-10 ruggedized TV Camera

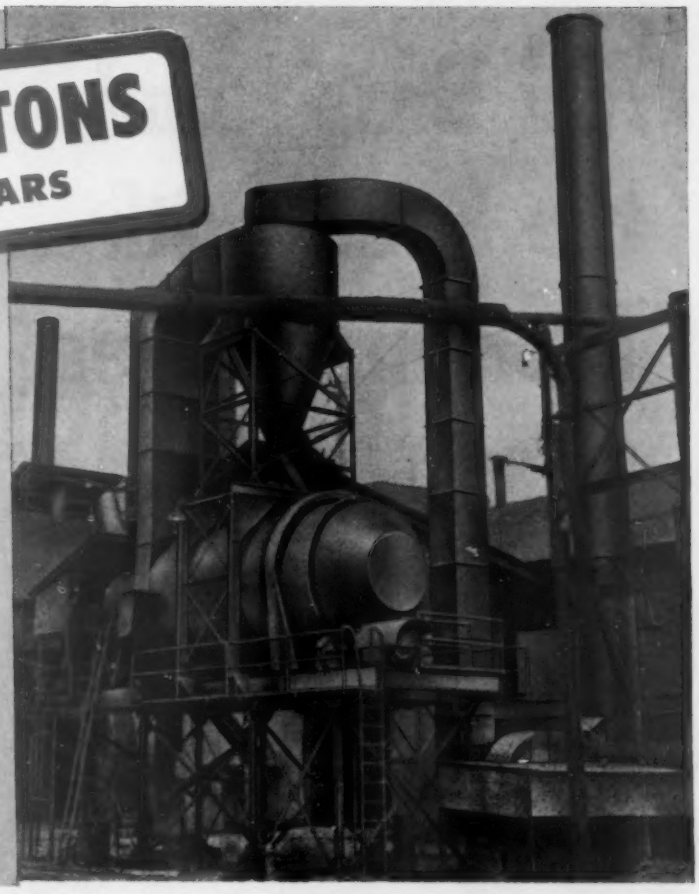
Riverside Cement's process control center utilizes 2 Thompson Ramo Wooldridge systems . . . the RW 300 computer and Dage closed-circuit TV.

DAGE **Thompson Ramo Wooldridge Inc.**
DAGE TELEVISION DIVISION
3407 W. 10th St., Michigan City, Indiana
Export Representative — Rocke International Corporation
13 E. 40th St., New York 16, New York

1,500,000 TONS
DRIED IN 3 YEARS

in this

Simplicity DOUBLE SHELL Dryer



"This dryer is one of the best pieces of equipment we ever bought"

comments one of the top production executives of National Cement Company, Birmingham, Alabama.

Operated 24 hours a day, this compact Simplicity double shell dryer has dried around 500,000 tons each year for the past three years . . . 1,500,000 tons and still operating efficiently. How many single shell dryers have produced half this tonnage before they had to be replaced?

The Simplicity dryer was originally bought to supplement the production of their two single shell dryers. It soon proved that the one Simplicity double shell dryer did the whole job with less effort, far lower fuel cost and a maintenance cost of less than 3c a ton. The single shell dryers have now been on stand-by for three years.

This standard Simplicity double shell dryer outperforms custom units costing several times as much. It has proven itself in drying all types of mineral aggregates, crushed stone, slag, portland cement, silica sand, sand and gravel. This double shell dryer is noted for its fuel economy. The cold incoming material in the outer shell is partially dried by the heat that is normally wasted in a single shell dryer. This saves fuel and protects the dryer from the destructive effects of heat.

The furnace gases enter the Simplicity dryer around 2500°F. to 3000°F. Actual exhaust temperatures measured at Douglasville, Georgia, on a hot day in June 1959 was 180°F. The heat goes in the material and not in the air. That is why fuel savings are so dramatic . . . in many installations fuel savings alone will pay for the dryer in three years or less.

Detailed specifications sent on request.

DEPENDABLE

THE SIMPLICITY SYSTEM

FROM BUILDER TO BUYER
BETWEEN MEN WHO KNOW

THE SIMPLICITY SYSTEM CO.

SHOLAR AVENUE · PHONE MAdison 2-2144

CHATTANOOGA 6, TENNESSEE

"My Boss Read the Specs with Tears in His Eyes"

He looked like he'd lost his best friend — money.

"Goodbye contract," he said quietly. "We just can't hope to meet these government specifications for aggregate."

"Yeah, it's pretty hopeless with our set-up. Of course, if we had a hydraulic classifier — " (I was kidding.)

"You're out of your mind. Around here water costs more than sand."

"Well how about an air separator, like Sturtevant makes?" I shot back. "Pete's brother runs a pit at Rapid City and says they clean sand without water. By de-dusting it."

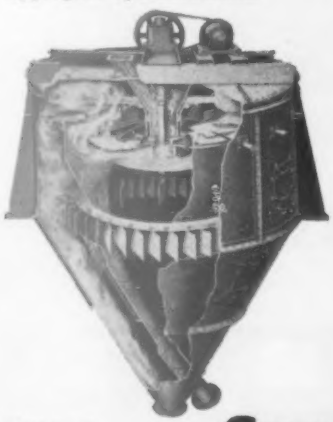
He was skeptical. "Aren't Sturtevants for cement?"

I nodded. "They are, but you see quite a few in aggregates, too, nowadays. Might be worth a try."

The Boss smiled for the first time that morning. "What the heck are you waiting for? Get 'em on the phone and let's see what they can do."

So we got the contract, thanks to the 12 ft. Sturtevant we now use for de-dusting and pre-classification. It's a beaut. Gives good service outdoors the year round, with no protection except for the motor housing.

If you're in this business, Brother, it might pay you to have a good long look at what a Sturtevant can do for tight aggregate specifications.



Sturtevant Air Separators classify production loads up to 150 tph by exact control of air currents and centrifugal force. Simple, quick adjustments make possible the selection (or rejection) of particles in the 30 to 400 mesh range. Nine standard models available, varying in size from 3′ to 18′.

Learn how a Sturtevant Air Separator can help your aggregates production. Write today describing your needs. Address: Sturtevant Mill Co., 104 Clayton St., Boston 22, Mass.

STURTEVANT AIR SEPARATORS CLASSIFY SAND WITHOUT WATER

PRODUCING CLEAN SAND, the Sturtevant acts as a de-duster by removing fine mesh particles from the throughput. Particularly valuable where water is limited.

EASING SCREEN LOADS, the Sturtevant rejects unwanted fines and circuits coarser sizes to screens for grading. By this pre-classification, the possibility of blinding screens with fines is minimized and output considerably increased. Also, excessive dust problems are eliminated.

WHEN BLENDING IS NECESSARY, the Sturtevant selects fines from the crushing operation. This stockpiled product then can be used in the blending operation to overcome fineness modulus deficiencies.

GRINDERS
CRUSHERS
PULVERIZERS
MICRON-GRINDERS

STURTEVANT MILL CO.

Dry Processing Equipment

The "OPEN-DOOR" to *lower* operating costs over *more* years

MIXERS
BLENDERS
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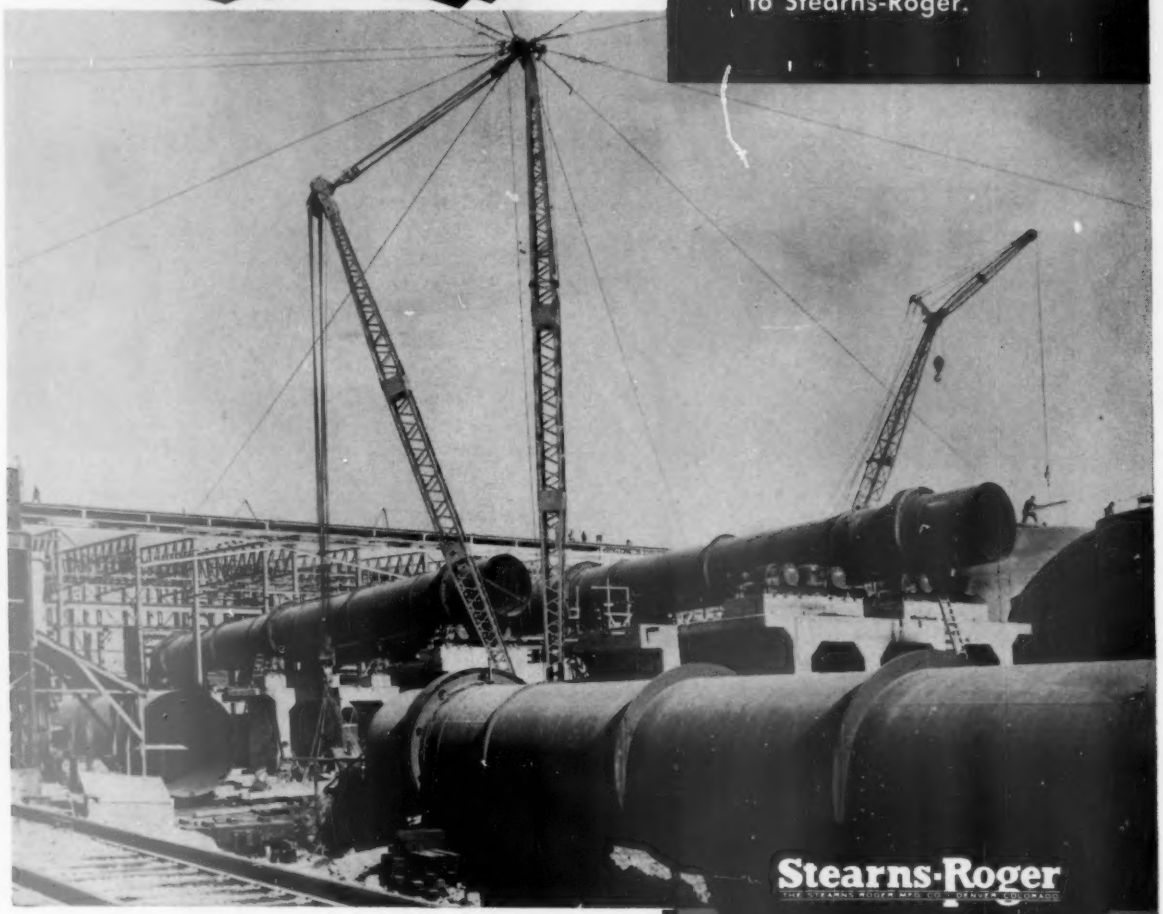

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Lightweight Aggregate Plant Built by Virginia Coal Producer

modern rotary kiln operation rated at 900 t.p.d.

By WALTER E. TRAUFFER

DIVERSIFICATION has become the major objective in modern industry as large companies broaden their bases by going into new fields. This was the primary reason that Clinchfield Coal Company, Division of The Pittston Company, went into the lightweight aggregate business early in 1959 with a large, modern new rotary kiln plant at Clinchfield, Va.

The Pittston Company has three bituminous coal mining divisions or subsidiaries in Virginia and West Virginia, seven fuel distributing subsidiaries (coal and oil) in New York, Boston, and Chicago, and five transportation and warehousing companies in eastern New York. Aggregates added a completely new field to the list. Another reason for this venture was the presence of suitable deposits of shale on company property.

The new plant is operated by the Lightweight Aggregate Department of the Clinchfield Coal Company, with offices in Dante, Va., 12 miles west of Clinchfield. In that area the company has 375,000 acres of land in one piece, including parts of five counties. In addition to coal mining, much lumbering has also been done, with sawmilling and shipping of 6,000,000 board-feet annually.

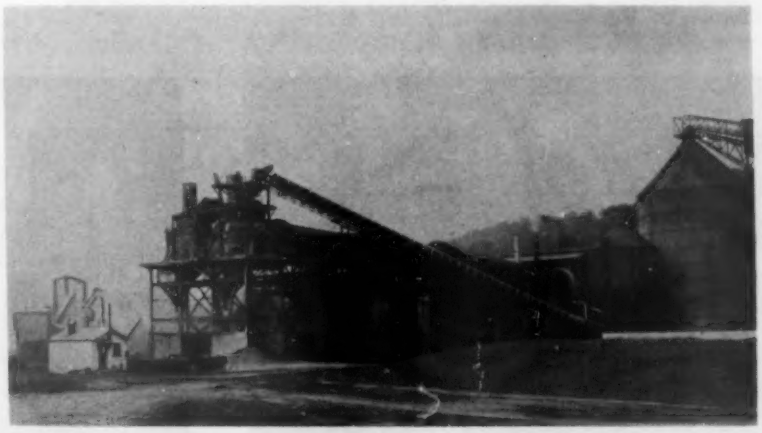
In 1954 the company management decided to investigate the potential for a lightweight aggregate plant at this location and had the shale deposits checked and tested. This work was followed by a commercial market survey, which showed that rail shipments could be made economically to eight states.

Next a study was made to determine what type and size of plant should be built. In January, 1958, the Link-Belt Company had just finished building the company's $30,000,000 new Moss No. 3 Mine and coal preparation plant at Carbo, near Clinchfield. This operation is considered the largest, most modern, and most highly-automated plant of its kind. As a result, Link-Belt also got the contract for this $2,500,000 rotary-kiln plant, which has a rated capacity of 900 tons daily.

Clinchfield engineers co-operated in the design, and the concreting and other construction was also done by company personnel. Link-Belt erected the belt conveyors and other equipment, did the kiln erections, etc. The plant's two rotary kilns were started up in May, 1959, and they are in full production of Clinchlite lightweight aggregate. The design of this plant provides for future doubling of capacity with minimum of trouble and expense.

The ¼-in. to 1½-in. prepared shale from the coal preparation plant is belt-conveyed to a 6000-ton reinforced concrete silo for storage. Four Syntron feeders discharge raw shale from the silo, as desired, to the 18-in. by 250-ft. belt conveyor and to the kilns. A Merrick Weightometer on this conveyor records the feed.

Shale is discharged through a split chute. A Syntron feeder controls the rate of feed to one kiln, and the balance goes by gravity to the other kiln. In this way the Weightometer and the feeder keep the feed to the kilns at



The lightweight aggregate plant of the Clinchfield Coal Company at Carbo, Va. The belt conveyor feeds prepared shale from the coal preparation plant (from the silo at the right) to the two kilns.

The rotary coolers discharge the calcined shale to a stockpiling belt conveyor. Note the stationary tripper part way up the belt for discharge to the waste pile in starting up kilns, etc.

the desired proportion and rate.

Both kilns are 200 ft. long. One is 9 ft. in diameter at the discharge end and for 150 ft. and then tapers to 7½ ft. The other kiln is 11 ft. in diameter for 150 ft. at the discharge end and tapers to 7½ ft. Both kilns slope ¾ in. per ft. and each is driven by a 75-hp., 440-v. motor through speed reducers. These motors have two speeds, 1,750 and 1,150 r.p.m. giving the kilns of 1½ and 1 r.p.m.

The feed end of each kiln is lined with 6 in. of reinforced lightweight concrete for a distance of 60 ft., and the balance with 9-in. refractory brick.

The kilns discharge their products into two 8- x 125-ft. rotary coolers. These have 30 ft. of 6-in. firebrick at their feed ends and for the balance 6-in. Z bar lifters. Both coolers are operated at 3 r.p.m., and their product at the discharge end can be held in the hand.

Each kiln is direct coal fired by a Raymond 352A bowl mill through plain burner pipes. Coal is stored in a 500-ton steel bin.

Kiln exit gas from each kiln goes to a pair of Multiclone dust collectors and *via* fans—84,000 and 75,000 c.f.m.—to short steel stacks.

The control board for each kiln is equipped with Minneapolis-Honeywell instruments, including the following: recording pyrometers for the kiln burning zone, feed end and exhaust fan, and cooler exhaust fan; temperature recorders for coal mill air and the kiln feed housing; draft indicator for the kiln hood; ammeters for all motors, and pushbuttons for all equipment up to the main stockpile.

Temperatures are held at about 2,000 deg. F. in the burning zone and 1,000 deg. at the feed end. Air from the hood to the coal mills is tempered to 185 deg.

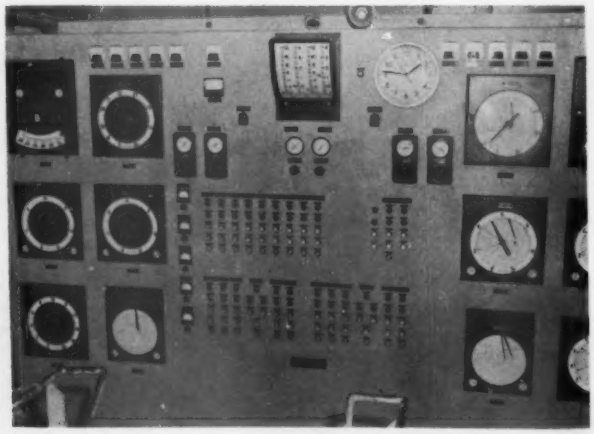
Both coolers discharge the calcined shale on a 24-in. by 345-ft. belt conveyor, which inclines to a height of about 125 ft. above ground level to discharge to a stockpile. A stationary tripper makes it possible to discharge to a waste pile when the kilns are being started up, etc. The stockpile has a capacity of about 12,000 tons of this clinker material.

In the reclaiming tunnel under the stockpile three Syntron feeders reclaim onto a 24-in. by 196-ft. belt conveyor, which inclines out of the tunnel to a 4-ft. Symons short-head cone crusher which reduces the clinker to ¾ in. minus. A 24-in. by 133-ft. belt conveyor feeds this material to a 6- by 16-ft. Link-Belt 2-deck screen with ⅜- and 3/16-in. openings.

The ⅜- to ¾-in. material over the top deck of the screen can go to storage as Clinchlite coarse, or to a

Weighing devices are used on the conveyor feeding the kilns and on the car-loading conveyor.

The kiln control boards have all the instruments necessary for complete and accurate control of all related operations.



150-cu. ft. bin. A Syntron feeder discharges from this bin to a 5- by 10-ft. Hardinge rod mill. This unit is loaded with 15,000 lb. of 2-in. diameter and 15,000 lb. of 1½-in. steel rods. It is driven at 19.75 r.p.m. by a 125-hp. motor through a speed reducer and reduces the material to 3/16-in. to 0 size at the rate of 20 t.p.h. A 24-in. by 90-ft. conveyor feeds this (Clinchlite fine) to a 24-in. by 150-ft. conveyor, which discharges it to a 3,500-ton stockpile.

The 3/16- to ⅜-in. material over the second deck of the screen (Clinchlite intermediate) is carried on a 24-in. by 60-ft. conveyor to a 1,500-ton stockpile.

All finished product piles are separated by retaining walls and are over a reclaiming tunnel. Five Syntron feeders—under the storage piles—feed any one material or a blend of two sizes onto a 24-in. by 390-ft. belt conveyor, which discharges *via* a split chute to either cars or trucks for shipment. All loading is done in layers to prevent segregation. Trucks are weighed on a 30-ton Howe truck scale. Car shipments are measured by a Merrick Model H Weightometer, with a Baldwin-Lima-Hamilton load cell weighing unit, on the loading conveyor.

All operations from the clinker stockpile to the finished product stockpiles are pushbutton-controlled from the secondary crushing and screening building. The reclamation and handling of the finished products is controlled by pushbuttons from the loading station.

The general manager of the Aggregate Department is Edward J. Head, who was also active in the design and construction of the plant. John W. Pash is general superintendent of the aggregate plant.

The plant viewed from finished product storage, with calcined shale storage in foreground. The building at right houses crusher and sizing screen.

This conveyor reclaims single or blended sizes from stockpiles for loading into cars or trucks.

$750,000 Pollution-Control Plan Under Way at Natl. Gypsum

Plans for a $750,000 air pollution control system will soon be implemented at the National Gypsum Company's New Brighton (Staten Island, N. Y.) plant. The work is expected to be completed in about six months.

The new installation will place the entire plant (except for four vapor-heating boilers which use light fuel oil) on natural gas as the primary fuel. Twenty-seven natural gas and oil burners and new dust collectors, ovens, dual burners, and automatic combustion control equipment comprise the anti-pollution setup.

The Crawford Lime and Quarry Company, Cedar Rapids, Iowa, has been cited by the Bituminous Casualty Company of Rock Island for operating for five years without a lost-time accident. The casualty company presented a plaque to Lee Crawford, owner of the lime company, and 16 of his employees.

An agreement to form a holding company, to be known as N.E.M.C.O. Portland Cement Company, Ltd., was signed recently by representatives of Eastern Nigeria Development Corporation, the Nigerian Engineering and Manufacturing Company Limited, and a German firm. This new concern will operate a plant in Port Harcourt.

The new president of the National Lime Association, John M. Junkin (The Warner Company), right, receiving the gavel from his predecessor, M. A. Rikard (Southern Cement Company).

New Market Possibilities

lime future bright, partly due to growth of lime-soil stabilization, new basic oxygen steel-making process

ANOTHER ON THE SPOT REPORT

AS IN many past meetings, the development of new markets for lime was the highlight of the 58th annual convention of the National Lime Association, held at The Cloister, Sea Island, Ga., May 23 to 25, 1960. The use of lime for stabilization of soils for highway and other construction was again given special emphasis, and other applications were discussed; but the greatest interest was in the large demand offered by new basic oxygen processes of steel manufacture.

Much interest was also shown in the association's research activities on a wide variety of subjects, including lime and clay mineralogy, lime-silica reactions, lime and lime-pozzolan stabilization, water treatment, etc.

The location, at beautiful Sea Island, off the coast of southern Georgia, added another to the growing list of ideal locations for meetings which combine business with attractive surroundings and recreation. In the last six years meetings have been held in California, Florida, Colorado, Alabama, Virginia, and now Georgia. It was announced that the Fall Operators' Meeting would be held September 29-30 and October 1 at the Conrad Hilton Hotel, Chicago, Ill. Dates for the 1961 annual convention will be May 11 to 13 at the Grand Hotel, Point Clear, Ala., where a most successful meeting was held in 1958.

Association Activities In his report on association affairs and activities, Robert S. Boynton, general manager of N.L.A., was optimistic about the future for the lime industry, largely because of the continued upward trend of lime-soil stabilization and the recent developments in the steel industry. The potential demand for lime which may be made by the new steel-making

One of the meetings in session, with Robert S. Boynton (left), general manager, N.L.A., and Kennedy Ellsworth (U. S. Lime Division) presiding, at the head of the table.

Stressed at N.L.A. Convention

By WALTER E. TRAUFFER

processes is difficult to estimate but it should be important, he said.

In commenting on his European trip last year, Mr. Boynton said that both the German lime industry and its association are larger than in this country, and that the lime use per capita is also larger. This association has embarked on a new 4-year research program costing $500,000 per year, and the German sand-lime brick association is matching the funds on this and other products. The biggest markets are building products—steel, and stucco, in that order.

In Germany 850,000 tons of lime are used annually by the sand-lime-brick industry, which has had a phenomenal growth since World War II. Similar growth has been experienced in Russia, Holland, and other European countries. The German lime industry employs many metallurgical experts who keep up with all the developments in the steel industry. Mr. Boynton suggested that N.L.A. hire such an expert. These men also do a tremendous selling job on stucco, which, if properly made and used, is attractive and economical. Efforts should be made to rebuild this market in this country.

A core from one of the oldest lime-soil stabilized roads in Texas is held by Chester McDowell, supervising soils engineer, Texas Highway Department.

National Lime Association
Certificate of Achievement
in Safety
The Thousand Day Club Of The Lime Industry
This Certificate is awarded to the
Quincy Plant
of
Marblehead Lime Company
For having operated safely without a lost-time injury to any employee during a period of one thousand days or more from June 8, 1957
In commemoration of this achievement, the National Lime Association, cooperating with the United States Bureau of Mines, has awarded this Certificate of special honor.
LIME

One of the five 1000-Day Certificates of Achievement in Safety awarded to member companies this year.

Elections John M. Junkin (the Warner Company) is the new president of N.L.A., succeeding M. A. Rikard, who had served for four years. The new vice-president is Amos B. Miner (National Gypsum Co.). Re-elected were Robert S. Boynton, general manager, and Georgia M. Coffman, secretary-treasurer. Kenneth A. Gutschick continues as manager, technical services, and Conard M. Kelley as highway engineer.

Lester Crown (Marblehead Lime Company) is a new member of the executive committee, succeeding the late Wallace E. Wing of the same company. The other members are: Reed C. Bye (the Warner Co.); Bolton L. Corson (G. & W. H. Corson, Inc.); Kennedy Ellsworth (U.S. Lime Division); C. C. Loomis (New England Lime Company); J. S. Offutt (U. S. Gypsum Company); J. H. Robinson (Gypsum, Lime & Alabastine Ltd.); E. D. Williams Jr. (H. E. Millard Lime & Stone Company); Frank J. Witmer (Ohio Lime Company); and Messrs. Junkin, Miner, and Rikard.

Safety Contest The winners in the 1959 N.L.A. Safety Competition were announced by Kenneth A. Gutschick. A big increase in enrollment in the contest was largely responsible for the fact that there were more plants without lost-time accidents than ever before —22—compared to 15 last year and the previous high record of 17 in 1956. These 22 plants are listed below in their contest classifications and in the order of their standing. All will receive N.L.A. Certificate of Achievement awards, and the winner in each class will receive a safety trophy at the fall operating Meeting in Chicago.

Class A-1—*Quarries with calcining plants working 100,000 man-hours or more:*

Four of the guest speakers, left to right: J. C. Harper, traffic consultant, Fleming-Harper Co.; George Hollon, professor, civil engineering department, University of Illinois; James L. Eades, N.L.A. research fellow, University of Illinois; James F. Crist, vice-president, The Southern Company.

U.S. Gypsum Co., Genoa, Ohio—445,387.

Standard Lime & Cement Co., Woodville, Ohio—349,434.

G. & W. H. Corson, Inc., Plymouth Meeting, Pa.—346,569.

U. S. Gypsum Co., New Braunfels, Tex.—256,361.

Ash Grove Lime & Portland Cement Co., Galloway, Mo.—245,003.

Kaiser Aluminum & Chemical Corp., Moss Landing, Calif.—237,-866.

Standard Lime & Cement Co., Knoxville, Tenn.—117,785.

National Gypsum Co., York, Pa.—104,244.

Class A-2—*Quarries with calcining plants working less than 100,000 man-hours*:

Diamond Springs Lime Co., El Dorado, Calif.—96,066.

Marblehead Lime Co., Grantsville, Utah—78,793.

Jones & Laughlin Steel Corp., Blair Limestone Div., Harpers Ferry, W. Va.—66,051.

Rockwell Lime Co., Manitowoc, Wis.—14,411.

Class B—*Underground mines with calcining plants*:

National Gypsum Co., Bellefonte, Pa.—359,428.

Standard Lime & Cement Co., Pleasant Gap, Pa.—223,646.

Standard Lime & Cement Co., Kimballton, Va.—190,088.

Marblehead Lime Co., Hannibal, Mo.—125,252.

Marblehead Lime Co., Quincy, Ill.—55,652.

Class C—*Calcining plants only*:

Marblehead Lime Co., Thornton, Ill.—160,798.

Marblehead Lime Co., Chicago, Ill.—117,124.

The Dow Chemical Co., Ludington, Mich.—86,467.

Ash Grove Lime & Portland Cement Co., Springfield, Mo.—73,166.

U. S. Gypsum Co., Farnams, Mass.—67,612.

Kelley Island New York Corp., Buffalo, N.Y.—49,425.

Special recognition was given to several multi-plant companies with perfect records in 1959. These include the following: Marblehead Lime Co. (5 plants, also injury free in 1958); Standard Lime & Cement Co. (4 plants); U. S. Gypsum Co. (3 plants); and Ash Grove Lime & Portland Cement Co. (2 plants).

Another outstanding accomplishment, said Mr. Gutschick, was the addition of five more plants to the 1,000-Day Club. Since this club was formed in May, 1937, only 20 such certificates have been awarded—less than 1 per year. 1,000-Day Safety Certificates were awarded to the following:

Standard Lime & Cement Co., Pleasant Gap, Pa.—(Record ended in March at 1,253 days.)

Marblehead Lime Co., Hannibal, Mo.—(Record ended in February at 1,129 days.)

Marblehead Lime Co., Quincy, Ill.—(Passed 1,000 days on March 5, and the record is still intact.)

U. S. Gypsum Co., Genoa, Ohio—(Passed 1,000 days on April 5, and the record is still intact.)

The fifth plant is Standard Lime's Knoxville, Tenn., plant, which passed 1,000 days on May 3; but there was not time enough to have the award ready for presentation at the convention. Incidentally, this will be the second N.L.A. safety award won by this plant.

New Steel Market

In *The Function of Burned Lime Products in New Steel Making Methods*, R. E. Edwards, Jones & Laughlin Steel Company, told of the new basic oxygen steel-making processes developed in Europe, which are now being adopted here. Three processes were developed—in Sweden, West Germany, and Austria—to fit special needs, especially the shortage of scrap iron. All require large quantities of burned lime.

Of these three, the L. D. process developed in Austria is the most popular. At the end of 1959 there were 65 such furnaces in existence, with a total capacity of 14,000,000 tons. Mr. Edwards described and illustrated the basic oxygen plant operated by his company at Aliquippa, Pa., which uses this process. This plant uses 170 tons of lime per ingot-ton, has a capacity of up to 136 t.p.h., compared to 20 t.p.h. for the old type of furnaces, and makes a better product.

The Swedish Kaldo process is similar in many respects. A new plant was recently completed in France, and two are planned in England.

The West German Rotor process also differs only in minor points. Plants are being built in Germany, Spain, and South Africa for this process.

Project Steering Committee

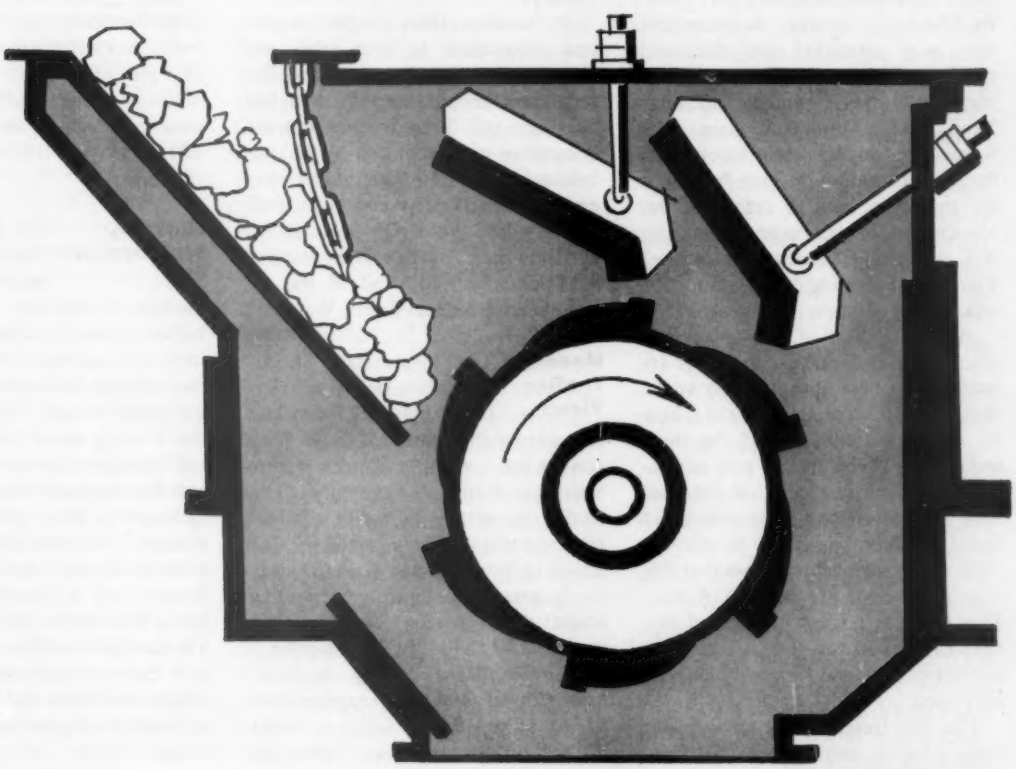
The new Project Steering Committee was described by its chairman, Amos B. Miner, as a marketing committee to investigate new and profitable markets and to advise on their promotion. Few such projects, he said, are of value to all members, but one exception is road stabilization research. It is believed that the work going on at the University of Illinois will be particularly helpful. Other current projects include water treatment, lime silica brick, etc. The best new market prospect, according to Mr. Miner, lies in the new processes of

Get Up to Fifty-to-One Reduction Ratio in Limestone With JOY-Hazemag Impact Crushers

Joy-Hazemag Impact Crushers have proven successful in one-pass crushing of limestone for aggregates, cement production and blast furnace flux. Working on the suspension impact principle, this crusher produces a cube-shaped product in a controlled spectrum of sizes. Reduction is controlled by varying the rotor speed, the position of the impact plates, and the feed rate. An example: limestone for fluxing can be crushed to a maximum grade product in a one-pass reduction to minus ⅛" plus 100 mesh.

Limestone crushed by the Joy-Hazemag makes the ideal road building material because the product is cube-shaped, breaking along the natural lines of cleavage.

Find out more about the advantages of the Joy-Hazemag impact crusher and its operating records with limestone There are 20 models available with capacities from 5 to 500 tons per hour. Write for bulletin 1730-26.



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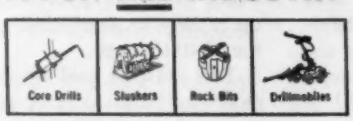

Joy Manufacturing Company
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steel making. The committee recommends hiring an expert to investigate this field and advise the industry on it.

Technical Committee Robert S. Boynton, chairman, said that the Technical Committee has met twice since the last convention—at the Operating Meeting last fall and again in March of this year at Urbana, Ill. New research initiated included mortar research at Franklin Institute and a broad study of lime trends made by the Southern Research Institute. A possible research program is being developed on lime-asphalt paving. A sub-committee is working on educational talks with slides for colleges.

Members of the N.L.A. staff present at this meeting left to right, first row were: Judy McFall, Norma Connor, and Georgia M. Coffman, secretary; Back row: Kenneth A. Gutschick, manager, technical services; Conard M. Kelley, highway engineer; and Robert S. Boynton, general manager.

Traffic Committee A report on the activities of the N.L.A. Traffic Committee since its formation in October, 1958, by Rhodes C. Berrey, chairman *pro tem*, was presented and discussed by J. C. Harper, traffic consultant, Fleming-Harper Company, Birmingham, Ala. This committee was formed to collect and disseminate traffic information on lime from and for members, and to represent the association at hearings before the ICC and other rate-making bodies. The second meeting of the committee was held in Chicago in August, 1959.

A rate proposal of broad scale application in Buffalo on September 16 marked the first time in many years that any extensive activity was taken by member companies of the lime industry to revise freight rate scales. A comparison of rates that exist on lime in eastern and southern territories, as compared to plaster or portland cement rates, shows that the lime rate scales are far out of line. This fact has adversely affected the sales of lime in this area. A general adjustment of lime freight rates was suggested.

The rail freight rates on lime in three eastern territories all differ. These rates were made many years ago, when transportation conditions justified them; but truck competition, decentralization of industry, shifts of population, and other factors have made them absurd. Rates for hauls up to 150 or 200 miles are far too high, compared to plaster or cement rates, which have been adjusted in recent years to reflect the influences of motor truck competition. This condition resulted from lack of action on the part of the lime industry men.

In the South there has been a general adjustment in lime rates, not only for southern producers but also for others shipping into the area; but there are still large areas where the committee can be of help. This, according to Mr. Harper, is the only major basic industry group which till recently had no such committee; and lime is one of the few basic commodities which took all of the 12 rate increases since World War II.

Modern Traffic Views The importance of cooperation between shippers (including lime) and the railroads was stressed by W. Mason King, vice-president, traffic, Southern Railway Company. The traffic committees of various industries are of great help in the formulation of rate structures as the railroads must take into greatest account the general picture, rather than that of the individual shipper.

The Southern Railway, he said, has followed a policy of keeping rates as low as possible in order to build up volume and promote industrial growth. Lime rates were recently reduced 10 percent in spite of increased costs. As a result, Southern's lime tonnage, which had dropped off between 1930 and 1940, has since gone up rapidly to nearly 300 percent of the 1940 tonnage.

This railroad, said Mr. King, promotes industrial development which also benefits the lime industry. It has geologists and a chemical laboratory to help develop natural resources. It has helped the lime industry by discouraging captive plants and can help it further in its race with competitive industries not involving railroad traffic. He mentioned an instance in which a large acetylene plant was established due partly to low rates offered by both the lime industry and the railroad.

Highway Stabilization In his report on the progress being made in the promotion of lime-soil stabilization of highway subsoils, Conard M. Kelley, highway engineer for N.L.A., said that several additional states are now using this process. There are now 30 states using some form of lime-soil stabilization, including lime-fly ash and lime-asphalt. Twelve have these included in their specifications. He reported considerable progress in northern states, where weather conditions are a handicap, including Iowa, New York, and South Dakota. The first jobs in Ohio and North Dakota came through the winter in excellent condition, and the oldest project in Nebraska has passed its fourth winter.

Foundation Stabilization Another new application of lime-soil stabilization — for building foundation subgrades—was described and illustrated by Kenneth A. Gutschick. Here ponding was used in conjunction with stabilization, in order to combat the problem

of dry expansive subsoils, with excellent results. In this technique the clay subgrade is soaked for at least 30 days, causing the clay to swell to its maximum. Then, after draining, the top 6 to 12 in. is stabilized with lime in order to form a moisture barrier which will hold the moisture in the soil and prevent possible shrinking. At the same time the lime dries out the top portion of the clay, transforming it within three days into a fine working table for construction of the overlying fill.

To date three ponding-stabilization jobs have been built in Texas—two highway department warehouses (Austin and Bryan) and one interstate subgrade project near Waco.

Texas Stabilization Chester McDowell, supervising soils engineer of the Texas Highway Department, who is a pioneer in the use of lime-soil stabilization, described the progress being made in Texas. The lime use for this purpose has now reached 119,000 tons annually and the volume is still going up. This is more lime than was produced in Texas in 1945. The efficiency of lime depends on the road design, and both efficiency and design are getting more attention and consequently better results.

Lime was first used for stabilization in Texas in 1935, but because of lack of knowledge the results were poor. Several years later the same materials were used and this installation is still increasing in strength after 15 years. Mr. McDowell's slides showed some of this type of work in progress. Specifications on the quality of lime and construction methods are now being prepared, including time limits between the various stages. In closing, he said that his department will be glad to help any other states interested in the subject.

R. E. Ferrall of Basic Incorporated told of his company's experiences with lime-soil stabilization, from the sales viewpoint. He used slides to show the methods of construction used and that the lime cost only 25 cents per cu. yd. in place, or from $3,000 to $7,000 per $1,000,000 spent on road construction. No extra work is involved. As a result, there is an encouraging increase in interest in this application.

Mr. Ferrall said that laboratory tests are essential, with 7-, 14-, and 28-day strengths and using 0, 3, and 6 percent of lime. Experience has shown, however, that to make sales, a quick rule of thumb estimate must be made of the amount of lime needed. This is possible if the type of soil is similar to others previously tested. Mr. Ferrall recommended limiting this type of work in this climate to April 15 to August 15.

Lime-Clay Mineralogy A report on the progress of the N.L.A Fellowship on Lime in Clay Mineralogy was given by James L. Eades, N.L.A. research fellow at the University of Illinois. This is basically a soils program, but it also involves lime-silica reaction which holds for other fields such as brick, mortar, etc. It aims to study the reaction of hydraulic lime with various soils, and it is necessary to prove to each highway department that lime will do the job with their soil.

Tests to date, including eight kinds of clay, all of which react favorably with lime, provide data to show permanency of action, resistance to leaching, etc. The second phase of the program, now started, includes all major soil types from all over the country.

Lime Pozzolan A progress report on the N.L.A. Fellowship on Lime and Lime-Pozzolan Stabilization was given by Professor George Hollon of the University of Illinois. This work, which is sponsored by the Illinois Division of Highways, N.L.A., and several lime producers, was started with the object of finding suitable substitutes wherever natural materials are diminishing.

Fly ash and slag were plentiful; so work was concentrated on lime-fly ash and lime-slag mixtures. Field test sections were built, and their performance data was correlated with laboratory results. A circular test track developed to give quicker results will also be used for lime-soil stabilization tests. By determining the quantity, quality, and moisture content of all ingredients, laboratory tests determined how these and the time of curing affected results.

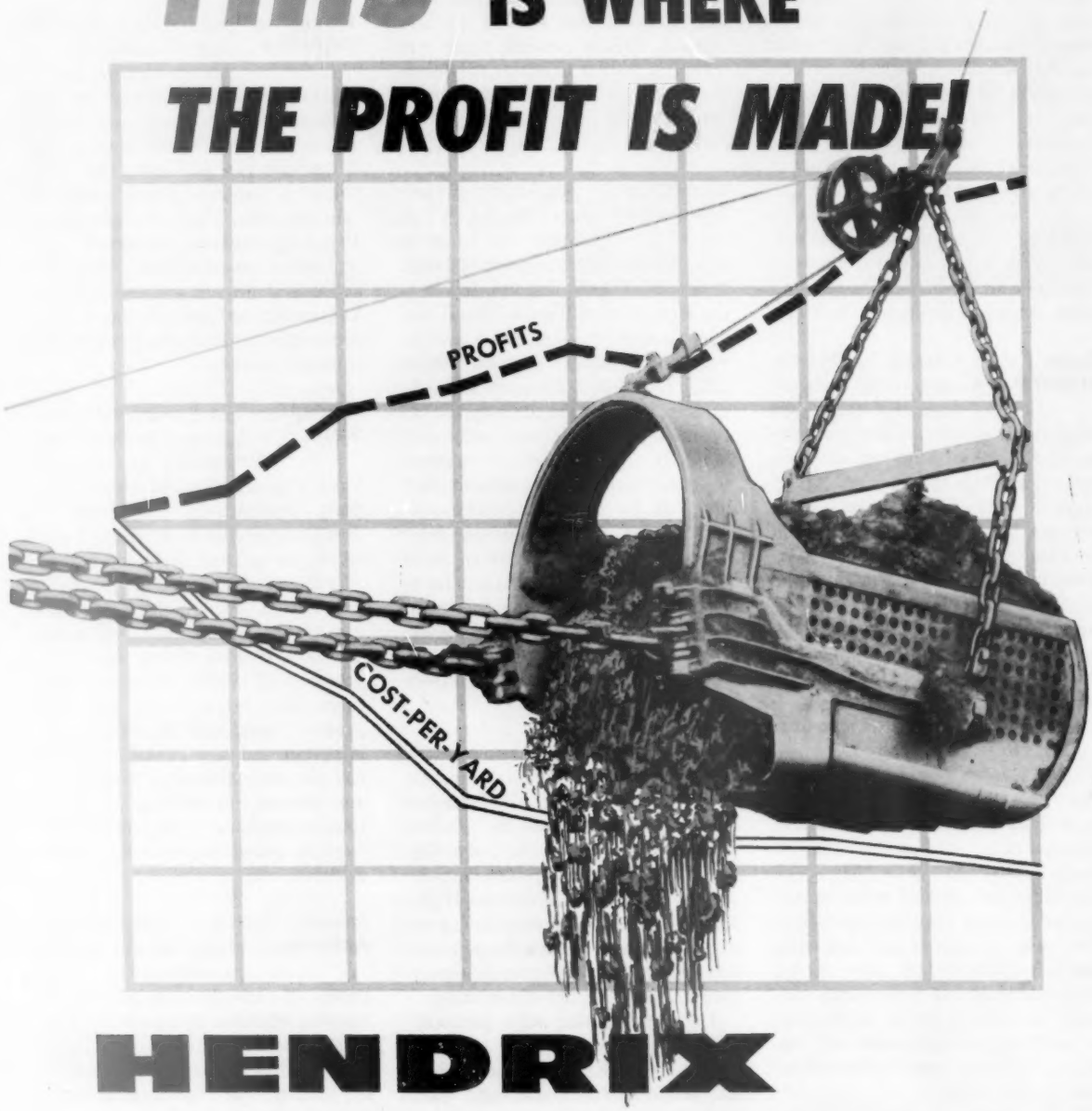
It was found that lime-pozzolan aggregate mixtures are excellent for base courses if properly proportioned, mixed, and compacted. According to Professor Hollon, a report on this work will be published soon.

Percentage Depletion According to J. Milton Cooper, N.L.A tax counsel, the Treasury Department will not act on percentage depletion cases now before the courts until a decision on the Cannelton case is handed down by the U.S. Supreme Court, probably late this year. There is a possibility that Congress may pass withholding legislation on dividends. With defense and foreign aid expenditures continuing, he pointed out, we are apparently committed to a continuing inflated economy.

Changing South The growing industrialization of the South was described by James F. Crist, vice-president, Southern Company, Birmingham, Ala., a power company serving four states. Using slides, he showed the large variety of industries in this area, in which growth has been both steady and rapid. His company is spending $192,000,000 on new facilities this year and $538,000,000 in the next three years to keep up with this growth. Lime, said Mr. Crist, is an important industry in this area, and has the most diversified end use of any commercial material. This results in rapidly changing markets and requires adequate research, better methods, etc.

Social Activities N.L.A. meetings are always held at resorts providing a wide choice of activities and recreation, and Sea Island is no exception. The night preceding the meeting there was a welcoming cocktail reception by courtesy of the International Paper Company, the St. Regis Paper Company, and the Union Bag Company. The following night there was a beach barbecue party, and the next night the annual dinner was held in the Beach Club patio. In between there was golf, swimming, fishing, bridge, etc. The golf tournament was won by Donald Ingram (New England Lime Co.) with a respectable gross score of 77. R. E. Ferrall was second with a 79.

THIS IS WHERE THE PROFIT IS MADE!



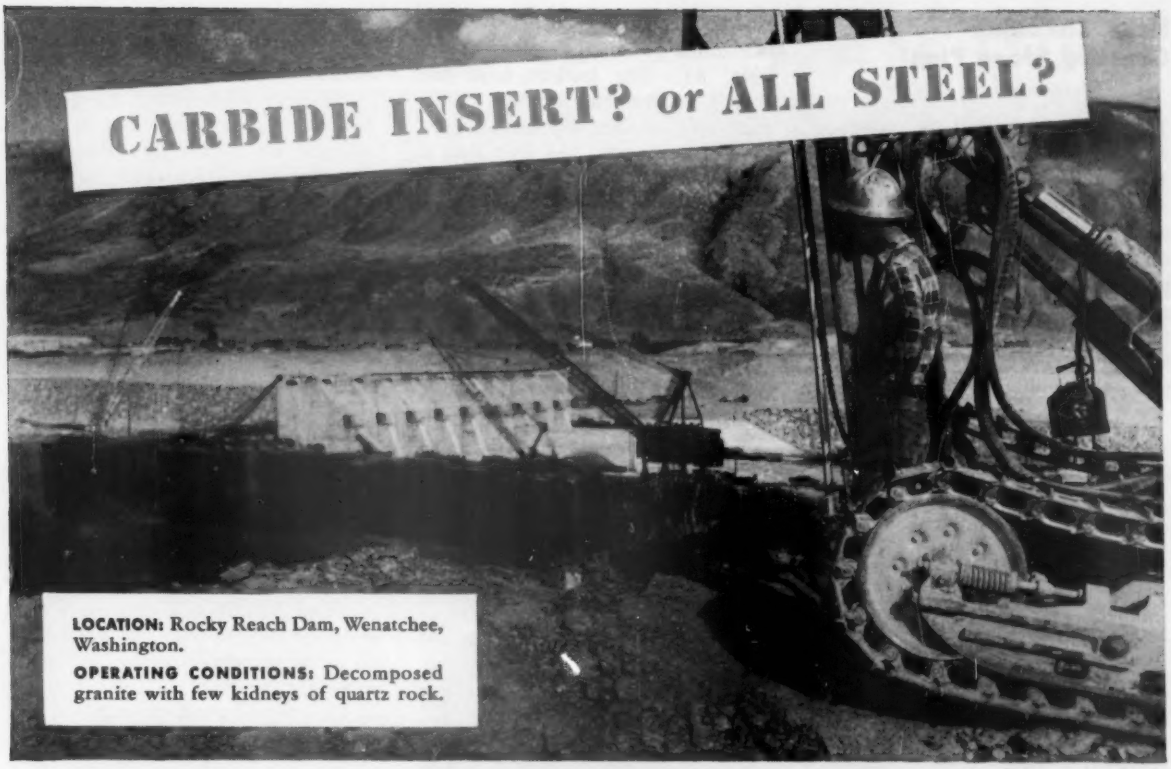
HENDRIX

DRAGLINE BUCKETS

"A Type for Every Digging Purpose"...
¼ to 40 Cubic Yards-Perforated or Solid

Hendrix Lightweight Dragline Buckets

HENDRIX MANUFACTURING CO., Inc.
MANSFIELD, LOUISIANA


CARBIDE INSERT? or ALL STEEL?
LOCATION: Rocky Reach Dam, Wenatchee, Washington.
OPERATING CONDITIONS: Decomposed granite with few kidneys of quartz rock.

"We drill 1400 to 2000 feet of blast hole per bit with TIMKEN® carbide insert bits"

...Reports Goodfellow Brothers, Inc.

DRILLING to relocate the Great Northern Railroad and Highway near Wenatchee, Washington, Goodfellow Brothers, Inc. selected Timken® carbide insert bits to drill blast holes in the decomposed granite and kidneys of quartz rock. Regrinding both gauge and flutes, they got 1400 to 2000 feet of blast hole from every bit.

That's the kind of performance you get with Timken carbide insert bits when conditions call for them. Their five front holes and deeper wing clearance help clear chips faster. You drill rock instead of chips.

But carbide insert bits may not always be your best bet. In ordinary ground, you'll save more with Timken all-steel bits. With correct and controlled reconditioning, they give you lowest bit cost per foot of hole when you can drill out full increments of steel.

But whatever your drilling conditions and whatever type of bit you use, your drillers will save time and you'll save money with Timken bits. They're all interchangeable in the same thread series. Your drillers can change bits as fast as the ground changes—without changing drill steels.

All Timken bits are made of Timken electric furnace fine alloy steel. We're the only American maker of removable rock bits who takes that extra step. And you get extra protection from a special shoulder union that protects threads from drilling impacts.

Get the right and most economical bit for your drilling jobs. Call or write: The Timken Roller Bearing Company, Rock Bit Division, Canton 6, Ohio. Cable: "TIMROSCO".

Timken threaded all steel multi-use rock bit

Timken threaded carbide insert rock bit

TIMKEN® ***your best bet for the best bit for every job***

removable rock bits

New Canadian Crushed Stone Plant

(*Continued from page* 99)

2-deck machine, usually equipped with ½-in. and 4-mesh wire cloth. This makes ⅝- to ½-in., ⅜-in. to 4-mesh, and minus 4-mesh products; and these are chuted into the other three 120-ton bin compartments.

Each of the five bin compartments has under it two Syntron vibrating feeders, one facing each side. Under the five feeders on one side is a 24-in. by 50-ft. reversible horizontal reclaiming belt conveyor (No. 8). The feeders have five speeds, adjustable through rheostats, and can feed any size or blend to this conveyor. At one end it discharges onto 24-in. by 60-ft. conveyor No. 9, which feeds radial stacker belt No. 10. This is a 24-in. by 125-ft. conveyor mounted on a radial stacker frame of Barber-Greene design. It runs on a rail on a concrete base and is motor driven. In an arc of 200 degrees it discharges to five 5,000-ton stockpiles. Trucks are loaded from these piles by Allis-Chalmers and Pettibone-Mulliken front-end loaders.

By reversing conveyor No. 8, any desired size or blend can be discharged on 24-in. by 80-ft. belt conveyor No. 15, which runs at right angles to discharge to one of five 360-ton compartments of a concrete truck-loading bin at a lower level. The four largest sizes from the 120-ton steel bins are discharged by their opposite Syntron feeders onto 24-in. by 65- to 69-ft. belt conveyors to the other four 360-ton truck-loading compartments. Trucks are loaded through two air-operated arc gates under each compartment with the size or blend required.

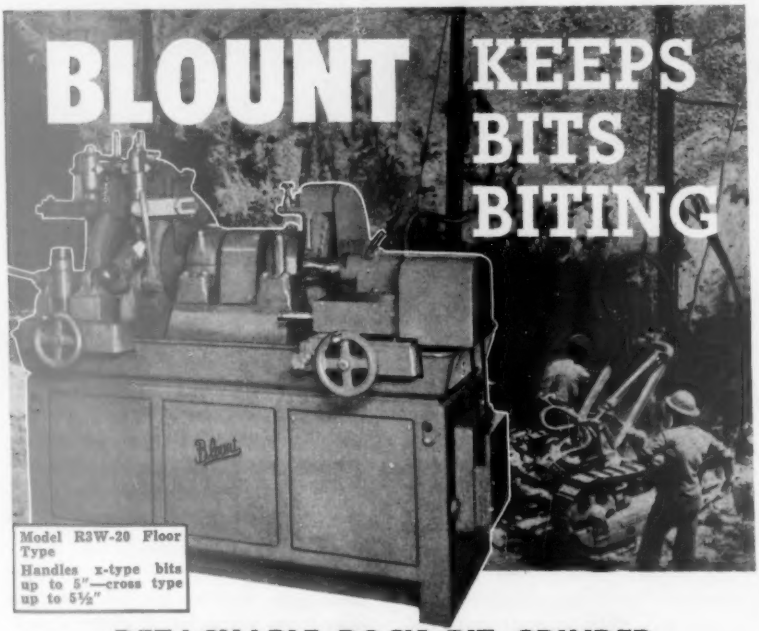
Plant control from the surge stockpile on is through a panel located near the top of the tertiary crushing building. There are start and stop pushbuttons and lights for all items of equipment in the flow, including the feeders; and blending of the finished product is also controlled.

The part gravity plays in this operation is evident from the following elevations — local, not sea level: quarry floor, 310 ft.; primary crusher feed level, 306 ft.; plant level, 221 ft.; and truck-loading level, 180 ft.

The main office of Milton Quarries Ltd. is at 85 Richmond Street West, Toronto 1, Ont. Officers are: John D. Bryce, president, and H. W. Salthouse, secretary-treasurer. Charles A. Poynton, sales manager, is also a director. Cyril R. Follette is plant superintendent.

According to Revenue Ruling 60-164, recently issued by the Internal Revenue Service, the following provision should be noted: in computing taxable income for purposes of the 50 percent limitation on percentage depletion, a net operating loss deduction available under Code Section 172 does *not* have to be deducted from "gross income from the property."

A permit has been taken out by Green Bag Cement Company management for the erection of three cement silos at Fairmont, W. Va., at a cost of $219,000.



DETACHABLE ROCK BIT GRINDER CUTS DOWN-TIME — LENGTHENS BIT-LIFE

BLOUNT machine-sharpens carbide-tipped rock drills far more accurately than any operator, however skilled, can by hand — and up to five times faster!

When you recondition your rock bits on a BLOUNT GRINDER, you can be sure of a uniform, symmetrical grinding job, including the exact angles the manufacturer intended.

Put a BLOUNT GRINDER to work for you, and get the savings so many customers report!

- ★ Longer bit-life — more regrinds per bit
- ★ Faster drilling
- ★ Reduced drilling upkeep
- ★ Lower cost per foot of drilling

PARTIAL USER LIST
Blount Bit Grinders:

Merritt Chapman & Scott Company, New York
Balf-Savin & Winkelman, New York
Shea-Kaiser & Morrison, California
Orinoco Mining Company (Subsidiary of U. S. Steel), Pennsylvania
Arch Dam Constructors, Utah
Subsidiary Companies of Bethlehem Steel Corp., Pennsylvania
Mount Vernon Contracting Corp., New York
Hanna Iron Ore Division (National Steel Corp.), Michigan
Jones & Laughlin Steel Corp., New York
Merritt Chapman & Scott Corp. of Panama, Balboa Canal Zone
James D. Morrissey Inc., Pennsylvania

J. G. BLOUNT Co.
Everett 49, Massachusetts
Div. Bowl-Mor Co., Inc.

Enter 236 on card, page 257

THERE'S A WORLD OF "CAN DO"

in the MASSEY-FERGUSON 1001 Tractor Shovel

NEW M-F FORK LIFT HAS INSTANT REVERSE

The 204 Fork Lift is another "MUST HAVE" in the Massey-Ferguson Industrial Line. The way the big 5,000-lb. capacity 204 "slides" into a load would warm any operator's heart. And it will go anywhere a tractor will go — smooth surfaces or rough — muddy areas. Instant Reverse gives the fastest smoothest operation you've ever seen! A wide range of attachments is available for marvelous versatility.

featuring INSTANT REVERSE

Here's a capsule description of the M-F 1001 — **powerful and rugged yet agile and fast.** Compare its price, performance, and quality-wise (and anywise for that matter) with the rest of the field! "HAVE DONE" performance has proven that the M-F 1001 —

CAN get you there and back while others are still on the way.

CAN out-perform larger, more expensive single-purpose machines on the big jobs.

CAN handle smaller, precision jobs with economy and dispatch.

CAN provide low-cost versatility because of numerous attachments.

The M-F 1001 gets big, heaped loads because of low-pivoted bull dozer action, tremendous pryout capacity, and extremely effective rollback angle. And it gets them fast because of "touch-of-the-toe" INSTANT REVERSE. No other tractor shovel in its class can boast of such maneuverability.

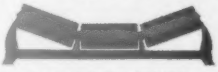
Why Wait? — Set a Date — We'll Demonstrate!

MASSEY-FERGUSON INDUSTRIAL DIVISION
Block 1000 South West St., Wichita 13, Kansas
Producing Sizeable Power for the "Sensational 60's"

MF 60-26

ATLAS IDLERS AND PULLEYS

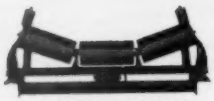
WILL INCREASE YOUR PROFITS BY HANDLING GREATER LOADS AT LOWEST COSTS



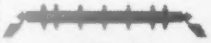
TROUGHING IDLERS

IMPACT IDLERS

RETURN IDLERS



SELF-ALIGNING IDLERS

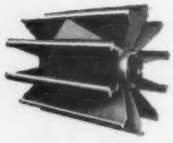


RUBBER DISC RETURN IDLERS

ATLAS idlers are available for 12" through 48" belts: 3½", 4" and 5" dia. rolls with ball and roller bearings.

For many years ATLAS idlers have been providing trouble free service. These idlers are designed to meet the most exacting requirements of general and heavy duty service. The use of ATLAS idlers assure users minimum maintenance cost and maximum equipment life.

SOLID TYPE CONVEYOR PULLEYS



WING TYPE SELF CLEANING PULLEYS WITH EASY ON — EASY OFF TAPER-LOCK BUSHINGS

See Your ATLAS Distributor or Contact • *Ask for Bulletins 8C and 9A.*

ATLAS CONVEYOR CO., CLINTONVILLE, WISCONSIN, U.S.A.

Manufacturers of portable and stationary conveyors and bucket elevators for handling loose material such as sand, gravel, crushed stone, coal, coke, cement, etc.

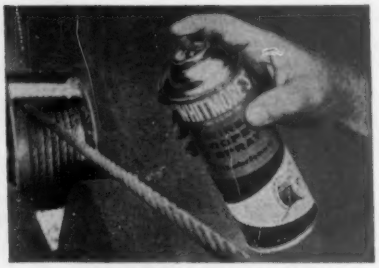
Enter 238-A on card, page 257

TRIAL SAMPLES

Of World-Famous WHITMORE'S Lubricants NOW IN AEROSOL SPRAY-ON CANS!

HANDI-LUBE LIQUID GEAR COMPOSITION

For open gears, sliding surfaces—exclusive formulas eliminate metal to metal contact, keep wear on the lubricant not the metal —no breakdown even after prolonged use under water—available for every climatic condition—packaged in handy 16-oz. aerosol spray-on containers or in bulk containers—send for a free trial sample.



WIRE ROPE SPRAY LUBRICANT

Exclusive formulas for lubricating and protecting wire rope, chain, springs. Penetrates to the core of wire rope minimizing internal friction and increasing usable life up to 300% —special protective qualities absolutely eliminate corrosion—non-gumming qualities reduce "carry-back"—packaged in handy 16 oz. aerosol spray-on containers or in bulk containers—send for a free trial sample.

65 YEARS OF LEADERSHIP LUBRICATING THE FOLLOWING:

- Open Gears, Dipper Sticks, Cams
- Enclosed Gear Cases
- Wire Rope and Cable
- Hydraulic Units, Torque Converters
- Roller, Ball, and Sleeve Bearings
- Speed Reducers

Est. 1893

THE WHITMORE MANUFACTURING CO.

LUBRICATING ENGINEERS

CLEVELAND 4, OHIO, U.S.A. PHONE: VULCAN 3-7272

Enter 238-B on card, page 257

World Wide Cement News

New Iranian Cement Plant Expected to Speed Progress

At Doroud, south of Tehran, Iran, a new cement plant has gone into production of standard specification, general-use cement. His Majesty the Shah of Iran was present at the ceremonies marking the opening of the facility.

Although economic progress has been slow in this small agricultural area, the opening of the modern plant has fostered a desire for advance ment and a degree of prosperity among the inhabitants.

It is expected that eventually a low-heat, low-alkali cement will be produced. In this event the plant may provide cement for the construction of the Dez Dam, south of Doroud.

At Ewekoro, 40 miles from Lagos in Western Nigeria, a new cement plant is under construction for the West African Portland Cement Company, Ltd. This plant, which is expected to be completed in October, will have a capacity of about 200,-000 tons per year.

Bids have been requested by the Hama Cement Company, Hama, Syria, for the construction of a plant with a capacity of 300 to 350 tons per day. At Aleppo a cement plant with a daily capacity of 330 tons is nearing completion. This facility is being built by the German Democratic Republic (East Germany).

Cement consumption in Belgium reportedly rose to 3,115,000 tons in 1959, a 9 percent increase over the 1958 consumption. In 1959 the total cement production was approximately 4.3 million tons—3.4 million tons being portland cement and most of the rest metallurgical cement.

According to a press release from Katmandu, Nepal, 15 Communist Chinese experts have arrived in this country to assist in building a cement plant. This facility, to be erected at Hathura, will have an initial capacity of 150 tons per day.

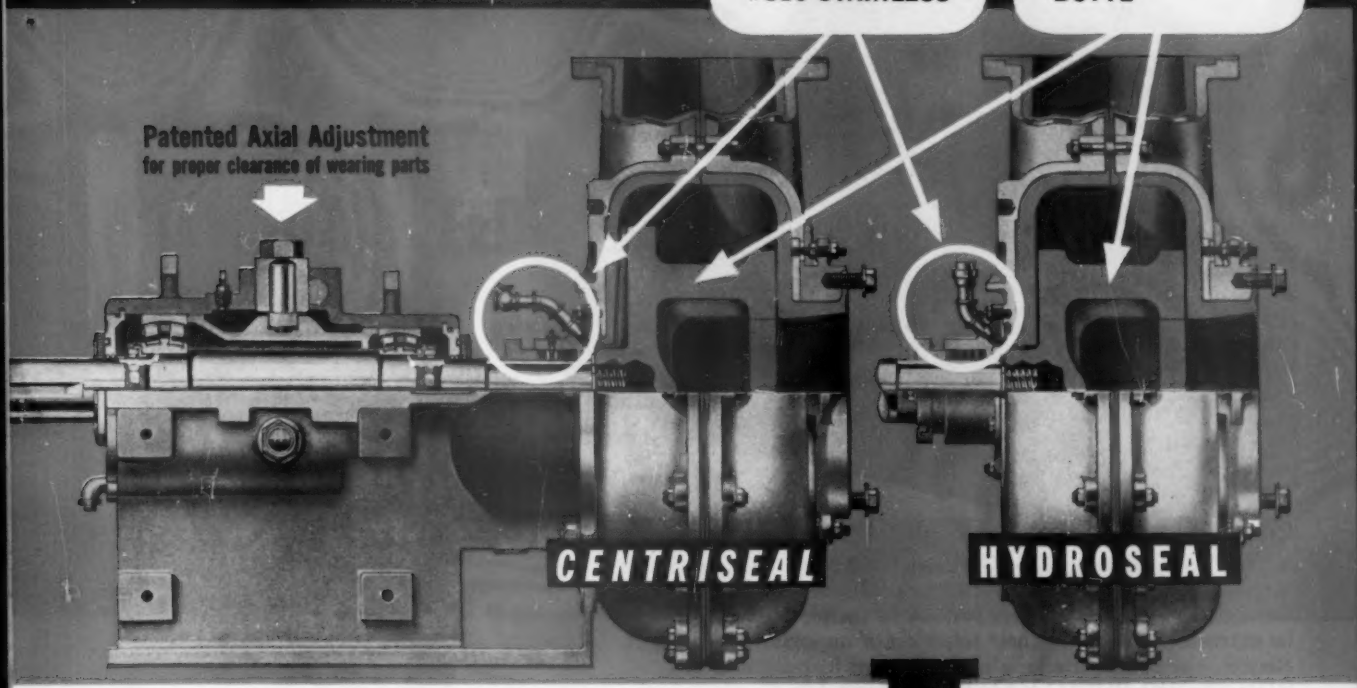
Flexibility helps A-S-H split-shell pumps lick problems in moving abrasives / corrosives

Choices for wetted parts

CARBON STEEL and/or CAST IRON
HASTELLOY "C"
DURIMET 20
#316 STAINLESS

Choice of **MAXIMIX** *elastomers*

NATURAL RUBBER
ACID RUBBER
NEOPRENE
HYPALON
NITRILE
POLYURETHANE (Cast or Molded)
VITON "A"
BUTYL



Delivers the pulp undiluted. No sealing water.

Operates with sealing water.

This diagram tells why these interchangeable pumps are proving to be so useful in mining and in both metallurgical and chemical processing. Experienced in applying the various metals and elastomers, our engineers may help you improve *your* pumping. Ask us.

THE ALLEN-SHERMAN-HOFF PUMP CO.
Dept. P—P.O. Box 635, Paoli, Pa.
Representatives throughout the World

CENTRISEAL and HYDROSEAL
SAND, SLURRY & DREDGE PUMPS
MAXIMIX RUBBER PROTECTED

Even in the remotest mining areas, ruggedness and freedom from service problems are ***musts*** *for crushers*

■ That's why the BIRDSBORO-BUCHANAN trademark is a familiar sight to natives in mining operations of many countries throughout the world. Management in these remote areas must be extremely careful in their selection of important equipment. Recently added to the long list of foreign installations of BIRDSBORO-BUCHANAN Deep Frame Jaw Crushers is the patented 42″ x 48″ unit now turning out 400 tons per hour in the Hierre de Arcari Iron Ore Mine in Peru. This heavy duty crusher was specifically designed to provide continuous trouble-free service.

Your Birdsboro representative can give you the profit-producing details for your own operation. *Sales Department, Engineering Department and Mfg. Plant:* Birdsboro, Pa.
District Office: Pittsburgh, Pa.

Canadian Representative & Manufacturer: John Inglis Co., Ltd., Toronto, Canada.

World-Wide Agent Representation. Contact home office for nearest representative.

CR 29-60

BIRDSBORO
CORPORATION

STEEL MILL MACHINERY • HYDRAULIC PRESSES • CRUSHING MACHINERY • SPECIAL MACHINERY • STEEL CASTINGS • Weldments "CAST-WELD" Design • ROLLS: Steel, Alloy Iron, Alloy Steel.

NEW D8H FEEDS 375 TONS OF GRAVEL PER HOUR—STILL HAS TIME FOR STOCKPILING

"Double-duty" is easy for the powerful, new Caterpillar D8 Series H Tractor at the Glacier Sand & Gravel Company of Steilacoom, Washington. Powered by a 235 HP Turbocharged D342 Engine and equipped with a No. 8S Hydraulic Bulldozer, the D8H divides its time equally feeding the gravel plant and stockpiling.

Says Superintendent J. W. Wyckoff, "We like the hydraulic 'dozer . . . and we are well pleased with the all-around performance and track life of our D8 in this highly abrasive material."

Operator J. W. Hendricks also adds, "Best tractor I ever ran. Work in 3rd gear practically all the time. Doesn't tire me out."

Other features of the Series H that rate high with owners and operators alike include: (1) the *full* Power Shift Transmission (optional) for faster cycle times; (2) service-free lifetime lubricated track rollers with patented *floating ring* seals; (3) stronger undercarriage for longer track life; and (4) power and fuel economy of the turbocharged engine.

Your Caterpillar Dealer can give you all the facts on the great, new D8 Series H Tractor along with proof of how it can pay off big on your operation. Call him soon.

Caterpillar Tractor Co., General Offices, Peoria, Ill., U.S.A.

CATERPILLAR

Caterpillar and Cat are Registered Trademarks of Caterpillar Tractor Co.

THE D8 SERIES H MAKES THE HARD JOBS SEEM EASY

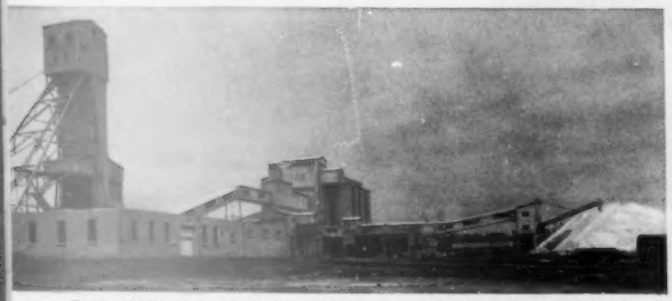
Enter 242 on card, page 257

Pass the salt...

from 2,000 feet below Lake Erie

...a job for USS Tiger Brand

Fairport Harbor Mine of the Morton Salt Company showing skip hoist at left and processing plant at right.



Rock salt discharges from the skip into a hopper and then flows on to a conveyor leading to the processing plant.

Skip hoist equipped with two Tiger Brand wire ropes. Two skips operate simultaneously—one discharges at the top while the other loads at the bottom.

The deepest salt mine in the United States is located at Fairport Harbor, Ohio, about 25 miles northeast of Cleveland. It taps a vast bed of salt 2,000 feet below the surface and extending far under Lake Erie. This is the first mine of its kind built in this country in the last 25 years. The shaft is deeper than the height of the Empire State Building.

Geologists estimate that the high-grade rock salt in this location will last over 200 years. The Morton Salt Company of Chicago, developers of the mine, aim to produce about 500 tons of salt an hour. All of it will be used for industries in the East and Midwest and for spreading on highways and sidewalks in winter.

USS Tiger Brand Wire Rope forms the vital connecting link between the salt bed and the surface. Two huge skips, shaped like rockets, have a capacity of 16 tons each and make 31 trips per hour. They are hoisted at a rate of 1,380 feet per minute by two Tiger Brand 2⅛" dia. Special Mine Hoist Ropes 2,580 feet long. These ropes provide the strength, fatigue and abrasion resistance necessary for safe and economical service. To prevent corrosion from the salt, the ropes are thoroughly lubricated at the factory and are relubricated every month at the mine.

Why USS Tiger Brand is your best buy. Tiger Brand Wire Rope is designed by one of the industry's most capable staffs of wire rope engineers. It is made by a company that maintains the most complete research and manufacturing facilities in the steel industry. When you buy Tiger Brand you get the right rope for the job. And your installation is no further away than a phone call from experienced American Steel & Wire field service representatives.

For more information, write American Steel & Wire, 614 Superior Ave., N.W., Cleveland 13, Ohio.

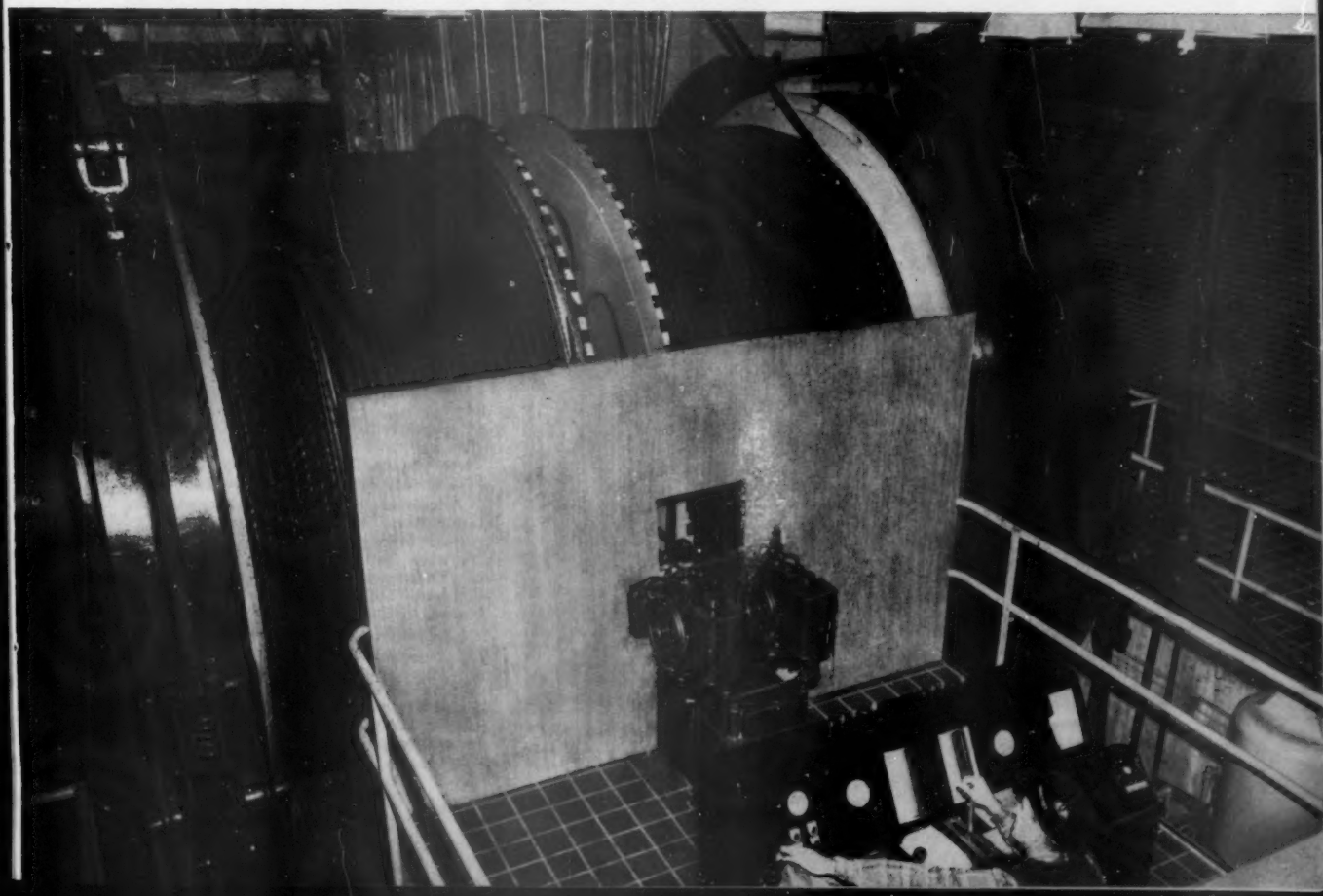
USS and Tiger Brand are registered trademarks

USS **American Steel & Wire Division of United States Steel**

Columbia-Geneva Steel Division, San Francisco, Pacific Coast Distributors
Tennessee Coal & Iron Division, Fairfield, Alabama, Southern Distributors
United States Steel Export Company, Distributors Abroad

Wire Rope

USS Tiger Brand Wire Rope on the huge 12-foot diameter skip hoist drums. Skip operator can tell when skip is loaded by a series of different colored lights. Depth indicators show position of each skip.



GarWood HOPPER TRAILERS ...SPEED HAULING OF SAND,

New Hauling Method Drastically Reduces Operating and Maintenance Costs

WAYNE, MICHIGAN—Gar Wood Industries, world's pioneer truck equipment firm, announces a revolutionary new bulk hauling method for any free-flowing material. Proved for the past eight years in widely diversified applications throughout the West, the method utilizes all-steel hopper trailers designed and built by Gar Wood.

Immediate and most important advantage of Gar Wood's hopper trailer method is the fact that far greater payloads can now be hauled over the nation's highways and roads. In addition, the method is much faster, less costly and there's no chance of damage or loss from spillage, weather, or contamination.

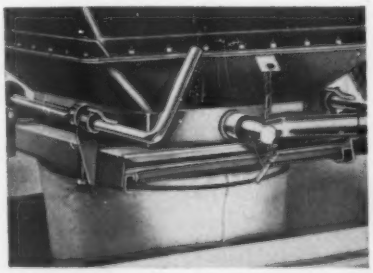
Payload increases and faster operation result from Gar Wood's exclusive Mono-Shell design which reduces tare weight, and from trailer design and mounting techniques that let Gar Wood distribute more weight over a much greater axle span. Mono-Shell hopper trailers let you increase legal payloads 23% or more per trip . . . even two or three tons more than other trailer methods.

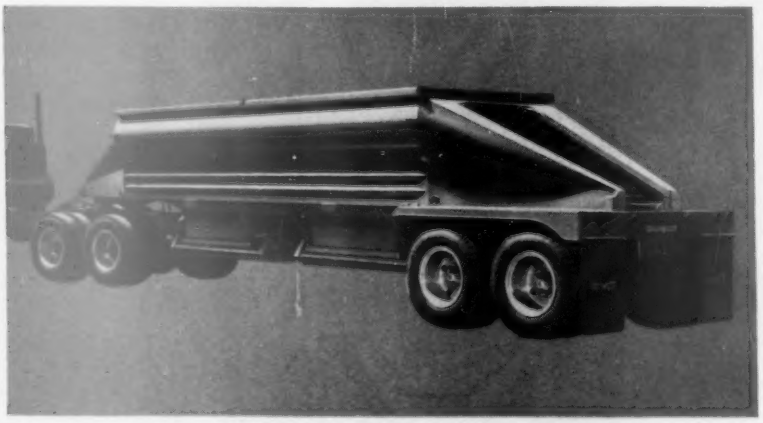
If you handle free-flowing materials of any type, the Gar Wood enclosed hopper method can provide an effective way to increase payloads and increase profits. It will pay you to get a complete payload analysis from your Gar Wood distributor.

PATENTED BUTTERFLY GATES INSURE FASTER, CLEANER, FOOL-PROOF OPERATION

Gar Wood's patented butterfly gates seal the load completely from dirt and water. They provide fast, safe dumping for powdered and granular bulk commodities . . . are safe and easy to operate . . . virtually maintenance-free. Removable sock assembly provides full protection from wind and weather during discharge, is easily attached, removed, and can be stored in weathertight compartment during transit. Only one sock needed per train.

For complete flexibility, Gar Wood offers a split butterfly gate. It operates either as a solid butterfly for cement and other powdered materials, or will handle aggregates up to 1½-inch diameter.





Gar Wood hopper trailer models are offered as double trains, and as semi-trailers for both single- and tandem-axle tractors.

Open Hoppers Ideal for Contractors

Contractor-type hoppers by Gar Wood are finding wide application in hauling dirt, aggregate, even hot asphalt. Hi-Tensile steel, all-welded construction makes them extra rugged. Yet light-weight Mono-Shell design means biggest legal payloads.

A complete line of discharge gates tailor Mono-Shell hoppers to your exact requirements. Gar Wood's air-powered clamshell gate has twin cylinders that close against the load. Optional cab-operated controls are widely used for fast, on-the-go dumping and windrowing.

Cable-operated door-type gate is ideal for pit dumping, plant-to-plant use and long-haul operations. Available with optional air trip or air rewind. Gar Wood also offers manually-operated clamshell gate, transverse spreader gate and rack-and-pinion gate models.

INCREASE LEGAL PAYLOADS GRAVEL AND CEMENT

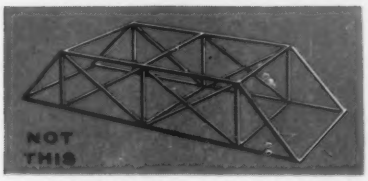
GRAVITY UNLOADING METHOD OFFERS MANY ADVANTAGES

New Gar Wood Mono-Shell hopper trailers give you the benefit of gravity unloading, the most economical of all discharge methods. You save on first cost because there's no mechanical or pneumatic unloading equipment tacked-on to the trailer price. You save plenty on maintenance, too. Gar Wood's patented butterfly gates are virtually maintenance-free.

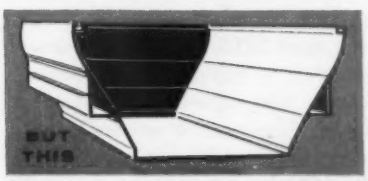
Added flexibility is another big advantage of gravity unloading. Long used by the railroads, this method is now available with high-speed, over-the-road truck equipment. You set your own delivery schedules! And, with compartmented Gar Wood models you can haul sand, cement, and aggregate all in the same unit . . . as you need them, *when* you need them.

Gar Wood's gravity unloading eliminates dead-weight mechanical or pneumatic discharge equipment . . . lets you haul 3000 to 4000 pounds *more* payload. In fact, the savings in weight alone can more than offset the cost of pit equipment.

Mono-Shell Design Eliminates Dead Weight

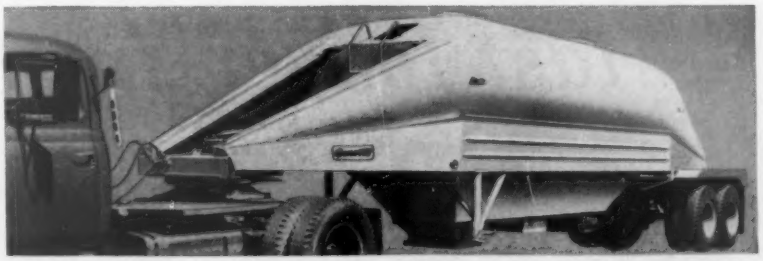


Conventional design has heavy frame and cross braces that obstruct loading. Shell must still be added to this complex frame.



With Mono-Shell hopper design the contours of the body shell itself form all the required strength and support for a stronger, yet lighter body.

These models can be equipped with either permanent or removable aluminum domes. Loading hatches are fitted with vented, self-locking covers which allow free "breathing" yet keep water *out*. They offer complete all-weather protection for hauling cement, lime, chemicals, and other commodities.



Enclosed Gar Wood Mono-Shell hoppers are also available as semi-trailer units and can be equipped with one, two, or three discharge gates. Some models are compartmented for fast, positive cleanout and for hauling different materials on the same trip without contamination.

Complete Sales and Service Facilities Through Gar Wood Distributors

Mono-Shell hopper trailers and gates are sold and serviced by the nation's largest network of experienced truck equipment specialists. These Gar Wood distributors know your local hauling problems, understand your state axle-weight laws. They can show you how Gar Wood hopper trailers are customized to give you bigger payloads, and they will assist you in arranging financing.

FIND OUT HOW YOU CAN INCREASE YOUR PAYLOADS AND PROFITS
SEND FOR FREE CATALOG TODAY

Name_____

Address_____

City_____ State_____

☐ SEND FREE LITERATURE

☐ SEND FREE PAYLOAD ANALYSIS FOR THE FOLLOWING:

Type of material hauled_____

Present type of equipment_____

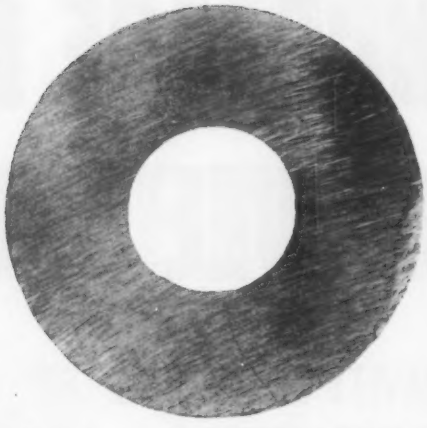
Tare weight of present equipment_____

Tons hauled per trip_____

Number of hauling units_____

Send coupon to:
GAR WOOD INDUSTRIES, INC.
Customer Service Dept.
Wayne, Michigan

Cross section of average extension steel, showing distorted center hole.



Cross section of Sandvik Coromant Steel, showing perfectly uniform center hole.

See for yourself why

SANDVIK Coromant Steels last longer on the job!

Sandvik-originated smooth rope-threads make uncoupling easy.

PROGRESS THROUGH BETTER TECHNOLOGY

BLUE RIBBON MINING AWARD 1960

The completely unretouched photographs above show clearly why Sandvik Coromant large-diameter extension rods last longer! Since Sandvik takes the time—and the trouble—to cold-roll these alloy drill rods, the flushing hole is uniform all the way through—smooth as a gun barrel. And, since the hole is even and perfectly round, you set up fewer strains and stresses in use...there's less whipping... and therefore, less breakage. And, with mechanically stronger rods, we can provide larger flushing holes for faster, more complete removal of cuttings.

What's more, the Sandvik-originated rope-thread makes coupling and uncoupling a hand operation—speeds the job—and reduces chance of incipient cracks developing from wrench marks.

All in all, you can't beat Sandvik Coromant Rope-Thread Steels for fast work and long life! Available from 1½" to 2" in diameter. To set up a test on **your** job, write to your nearest Atlas Copco office today. Address: Dept. PQ-17.

Atlas Copco

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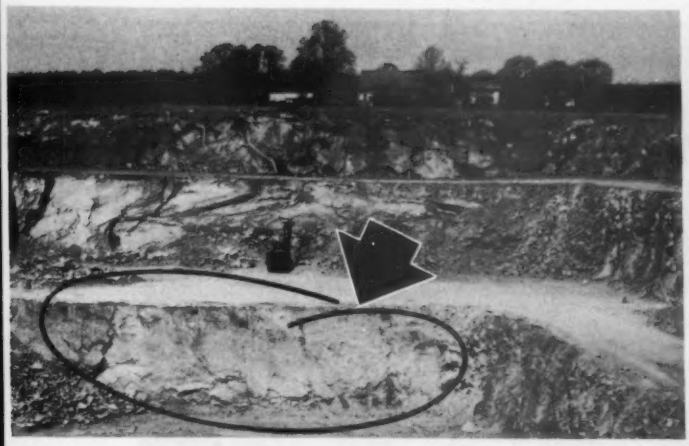
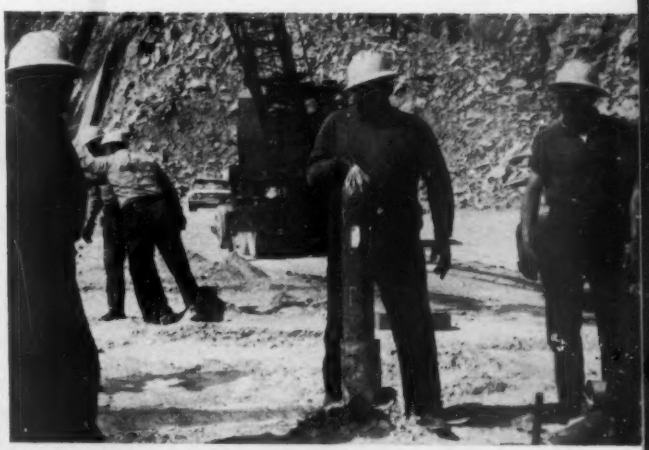
LYtell 1-0375

The shot *not* heard around the world

How 2 new Du Pont products lowered the "boom" *and* the cost of this limestone quarry blast



1 THE PROBLEM: Private farm (top of picture) is very close to 50′ limestone face to be blasted (arrow). Bradford Hills Quarry Co., Downingtown, Pa., wanted to (a) keep on good terms with its neighbors by keeping noise down, and (b) get the limestone out at lowest cost without sacrificing safety. Two new products from Du Pont teamed up to help them accomplish these results.



2 ANSWER NO. 1: 2,500 pounds of Du Pont's new "Tovex"-Gel and 2,000 pounds of "Nilite" WR for top load were put into 11 holes. This low-cost explosive has blasting energy equal or superior to higher priced gelatins, and high borehole density that gives more energy per foot than most other explosives. It's safer, too. Contains no nitroglycerine. Handles better. Brings maximum economy to blasting operations.

3 ANSWER NO. 2: New Du Pont LEDC (Low Energy Detonating Cord, developed by the Ensign-Bickford Co. in a cooperative effort with Du Pont) hushes the noise of blasting. LEDC trunk line, shown here being connected to down line of "Primacord," contains only 2 grains of explosive per foot, contrasted to 50 grains per foot of regular "Primacord." During this shot, neighbors heard little more than the sound of the breaking rock.

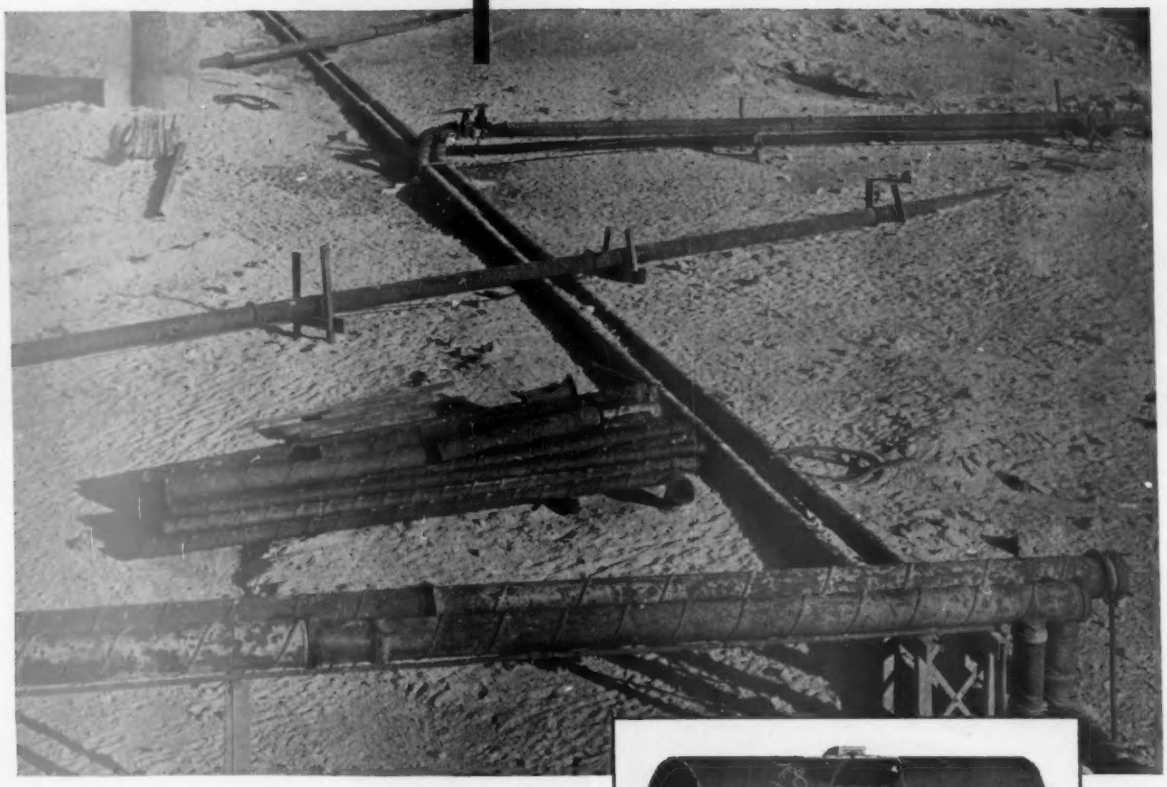
4 RESULT: Over 15,000 tons of well-broken limestone. And no noise complaints from neighbors. For a demonstration of "Tovex"-Gel or the Du Pont engineered Low Noise Level Trunk Line Delay Blasting System using LEDC, call your Du Pont Explosives distributor or representative. Or write Du Pont, Explosives Department, 6440 Nemours Building, Wilmington 98, Delaware.

DU PONT EXPLOSIVES

BETTER THINGS FOR BETTER LIVING . . . *THROUGH CHEMISTRY*

How to Save Time and Money

Use This NAYLOR Pipe and Coupling Combination



When it comes to pipe lines in mining and quarrying service, you'll like the combination of NAYLOR Spiralweld pipe and Wedgelock couplings.

Easier handling comes naturally with this lightweight pipe. The NAYLOR lock-seamed-spiralwelded structure adds the strength and safety your job requires.

With the Wedgelock coupling, you save time in making connections, and simplify the work involved since a hammer is the only tool required to connect or disconnect it.

The NAYLOR Wedgelock coupling makes a positive connection, securely anchored in standard weight grooved ends.

For air, water, tailings or ventilating lines, it will pay you to consider this hard-working combination. Just ask for Bulletin No. 59.

NAYLOR PIPE Company

1257 East 92nd Street, Chicago 19, Illinois

Eastern U. S. and Foreign Sales Office: 60 East 42nd Street, New York 17, N. Y.

SPECIAL REPORT TO CATERPILLAR OWNERS:

CAT CATERPILLAR

Parts you can trust
... cost less per hour

Converting to Lifetime Lubricated Track Rollers costs less than you think

Lifetime Lubricated Roller Groups, including seals, shafts and end collars, *cost only a little more* than ordinary Bellows Seal Rollers without end collars. But this small expense of *initial* installation rapidly disappears through noticeably lower owning and operating costs.

Based on savings from seal replacement alone, Lifetime Lubricated Rollers soon make up the difference. The metal rings of the Floating Ring Seal can be used over and over again. Take a 14-roller D8. At every roller rebuild, you probably have to buy 28 bellows seals @ $3.97* each or a total of $111.16. Compare this with the rubber "O" rings costing a total of only $45.08*. You save $66.08 in seal replacement costs every time you rebuild or replace. Similar savings are available on all models. And, replacement Lifetime Lubricated Roller and shaft assemblies without end collars are priced below those of Cat Bellows Seal Rollers.

But your savings don't end here! Here are other benefits you get from Lifetime Lubricated Track Rollers:

1. Longer Lived Roller Shells and Component Parts. The Lifetime Lubricated Roller is much stronger and has more metal in the wear zones, specially hardened for extra resistance to wear. And bushings, bearings and shafts are larger and stronger and will last longer. These components are *always* bathed in *clean,* heat-dissipating oil (not grease). Dirt just can't get in to accelerate wear—oil can't get out, thanks to the patented Floating Ring Seal. This means you won't be buying as many replacement bushings and shafts at rebuild or roller replacement time.

2. Maintenance Is Eliminated. Lifetime Lubricated Rollers need no servicing until they're finally rebuilt. You don't have to spend any time nor money for lubrication during the rollers' lives.

3. Easier Installation. Snap-on rings hold seals and end collars in place *before* mounting. End collar bolt holes line up easily with track roller frame holes at installation. Your tractors will be on the go much sooner.

See your Caterpillar Dealer. He'll give you the complete facts on the economy of investing in Lifetime Lubricated Rollers . . . for *all* Caterpillar track-type equipment.

Caterpillar Tractor Co., General Offices, Peoria, Illinois, U. S. A.

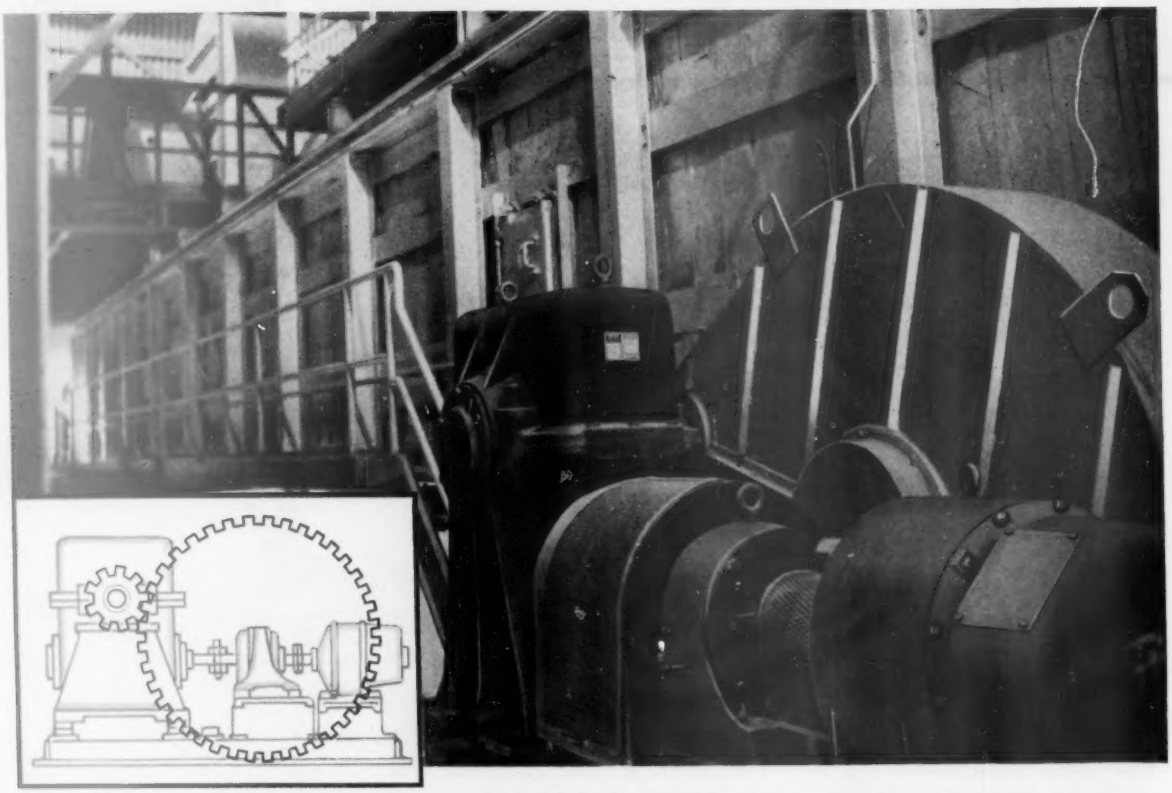
*Suggested consumer prices for these Caterpillar parts

SERVICE TIP: Lifetime Lubricated Rollers need no servicing. But when rebuild time finally comes, keep metal rings matched in original pairs.

CATERPILLAR

Caterpillar and Cat are Registered Trademarks of Caterpillar Tractor Co.

Foote Bros. Drives In The Cement Industry



Team of Reducers GIVES PERFORMANCE PLUS Driving Marquette Cement's ACL Grate

Two Foote Bros. Reducers team up to provide a powerful, close-coupled drive for the ACL Chain Grate used in Marquette Cement Company's ultra-modern Milwaukee plant.

Dependable power—and plenty of it—was required to drive the head shaft of the 82 ft. long x 12½ ft. wide furnace grate which moves pelletized raw material through the drying and preburning chambers.

Problem: In a limited space, provide a right angle drive capable of delivering a final torque of 1,400,000 in. lbs. at the head shaft of the grate.

Solution: To provide the necessary reduction from a 20 HP variable speed motor, a Foote Bros. 224 SL concentric shaft Reducer was coupled to an 18 S Right Angle Worm Gear Reducer which drives a large spur gear set to turn the grate.

The smooth, steady, and positive grate travel provided by the team of Foote Bros. Reducers, is an important requirement of the carefully balanced Marquette process. Since going into service almost two years ago, the Drives have met every requirement of Marquette's design and production engineers for "no downtime" performance.

There's a Foote Bros. Drive made to meet your power transmission requirements. Ask your nearby Foote Bros. Authorized Distributor for information or assistance concerning your power transmission problems. He's ready to help you.

FOOTE BROS. GEAR AND MACHINE CORPORATION
4571 South Western Boulevard, Chicago 9, Illinois

POWER TRANSMISSION DRIVES

Mr. Vernon J. Verplank, president of Spring Lake Coal & Dock Co., supervises the weighing of his dump body train of Alcoa Aluminum. The lightweight units haul a combined payload of 42½ tons per trip.

PROFITS UP $50 PER DAY WITH DUMP TRAIN OF ALCOA ALUMINUM

Daybrook Hydraulic Division of Young Spring and Wire Corp., Bowling Green, Ohio, built these two dump trailers of Alcoa® Aluminum. Together they are earning $50 per day *extra* for Spring Lake Coal & Dock Co., Spring Lake, Mich. Credit goes to aluminum's light weight and effective axle spacing which allow payloads of 42½ tons per trip in the two units which are operated as a train.

"Our aluminum trailers operate around the clock hauling coal, gravel and limestone," says Mr. Vernon J. Verplank, Spring Lake president. "We count on the units making five 70-mile trips a day, and we estimate extra profits at $10 per trip. In addition to their big extra payload capacity, we like their strength. Since we switched to aluminum, we're no longer bothered by trailer bodies 'ripping' due to highway vibration while hauling coal. They've been in service a year now and show no signs of wear. We also estimate another $300 yearly saving because our aluminum trailers will never need painting."

You can improve your profit picture by switching to trailers of Alcoa Aluminum. Details on how a number of fleet owners benefited by switching to this strong, lightweight and maintenance-free metal are available in a case-history booklet that is yours for the asking. For your copy, write today to Aluminum Company of America, 1779-G Alcoa Building, Pittsburgh 19, Pa.

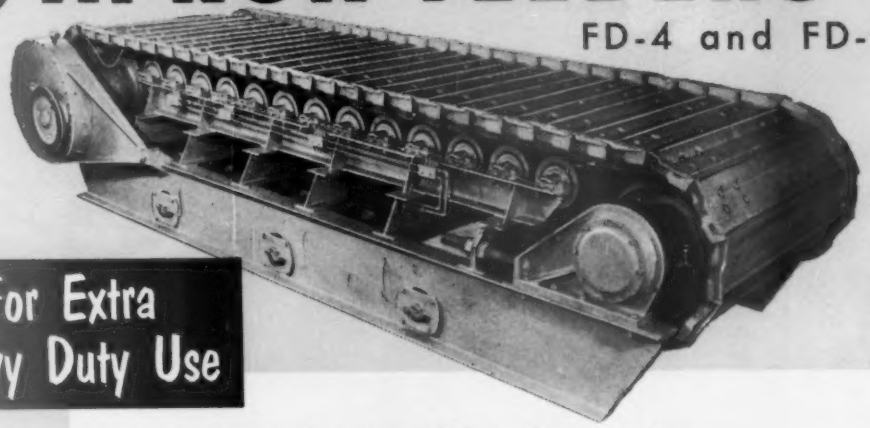
Spring Lake's trailer train makes five round trips daily, hauls 23 more tons of payload than the single steel unit formerly used.

ALCOA ALUMINUM

ALUMINUM COMPANY OF AMERICA

NICO APRON FEEDERS

FD-4 and FD-8



For Extra Heavy Duty Use

- Uses Mass Produced Standard Crawler Tractor Parts
- Short Pitch, 8" on FD-8, 6-¾" on FD-4, provides more even feed
- Decks of Cast Manganese or Formed Alloy Steel
- Larger Diameter Head and Tail Shafts
- Anti-Friction Self-Aligning Bearings
- Centralized Lubrication Available
- Uses NICO Shaft Mounted Reducer . . .
  Eliminates open gearing and lubrication problems

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REDUCE YOUR RATIO

OF FUEL-to-CEMENT

In these days of increasing fuel and labor costs, every economy you can make is important. Here is a sure way to SAVE FUEL. Cambridge Gas Analyzers will provide the Burner with a continuous and simultaneous record of the oxygen, carbon dioxide, and combustibles in the flue gas. O_2 analysis serves to warn against excessive air supply; combustibles analysis indicates oxygen demand under all conditions; CO_2 analysis reflects state of calcining process. Cambridge Instruments make uniform kiln operations possible with ease. Savings effected pay for installation in short time.

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CAMBRIDGE GAS ANALYZERS

PIONEER MANUFACTURERS OF PRECISION INSTRUMENTS

Enter 252-B on card, page 257

got a
SPRAY NOZZLE
problem?

perhaps one of our **DATA SHEETS** *can suggest a solution*

For almost every spraying application, there's a Spraying Systems Data Sheet that gives useful information on suggested installations and types of nozzles to use. If you have a problem, write and let us know the application involved . . . and we'll send the Data Sheet that applies.

SPRAYING SYSTEMS CO.
3224 RANDOLPH STREET • BELLWOOD, ILLINOIS

And . . . for complete spray nozzle information, write for Catalog 24.

Enter 252-C on card, page 257

Enter 253 on card, page 257 →

Kittanning Brick Company's Diesel-powered Plymouth hauls heavy loads of clay from mine to tipple. Mine-O-Motive unit pulls big loads with exceptional economy.

"7-ton PLYMOUTH Hauls 14 Cars Per Trip"

Reports Kittanning Brick Company, Adrian, Pa.

"Using a Plymouth Mine-O-Motive, we can now pull 14 cars or more from our clay working area to the tipple, with a crew of only 2 men," reports the president of Kittanning Brick Company, Adrian, Pa.

"The hauling efficiency provided by our Plymouth Diesel has enabled us to increase our daily clay production—saves us both time and money. Our system has improved employee morale and we always have empty cars to load, which reduces total man-hours per ton.

"Our narrow-gauge Model FMD hauls clay 48-hours a week over a 2-mile route, consumes only ½ gallon of fuel per hour. Four-gear shift enables it to pull a 14-car load over 6% grades with full power at all times."

For full information on a Plymouth designed to fit your haulage needs, send a brief outline of your operations to: The Fate-Root-Heath Company, Dept. A-15, Plymouth, Ohio.

PLYMOUTH® LOCOMOTIVES

WITH TORQOMOTIVE DRIVE

RAIL POWER

PLYMOUTH LOCOMOTIVES—
in PROGRESSIVE INDUSTRY
throughout the WORLD

ALSO BUILDERS OF
F-R-H CERAMIC MACHINERY

Need MORE capacity?
...headroom limited?

Here's how to increase production of sized material *without increasing headroom:* Replace your smaller inclined vibrating screens with Deister Type UF Horizontal Screens.

These big-capacity screens will fit in existing plants where lack of headroom disqualifies larger inclined screens. Space-saving Deister Horizontal Screens also merit careful consideration in new plant designs . . . permit reduction of overall building height.

Type UF Screens are available in single, double and triple deck models —widths of 3, 4 and 5 feet—lengths up to 18 feet. An important feature of these screens is Deister's exclusive Unitized Life-Time Vibrating Mechanism. All rotating parts run in an oil mist, permitting higher operating speeds at lower temperatures. Inner and outer labyrinth seals keep lubricant in . . . unit requires only one seasonal oil change.

Like all Deister Screens, the Type UF is built for years of hard-working, trouble-free service. The dependability of Deister Screens is a matter of record in plants from coast to coast. Write for engineering recommendations on your screening problems.

DEISTER MACHINE COMPANY
1933 East Wayne St., Fort Wayne, Indiana

HEAVIER OUTSIDE WIRES mean great resistance to abrasion. FINER INSIDE WIRES mean excellent drum winding characteristics.

In REGULAR LAY ropes the wires are laid in a direction opposite to the lay of the strands. This provides stability even under severe operating conditions.

In LANG LAY ropes the wires and strands are laid in the same direction, providing exceptional flexibility and abrasion resistance.

Two ropes in one! Roebling Herringbone® Wire Rope is designed and made to wear better, work better, last longer than you can possibly imagine . . . unless you've tried it yourself!

Herringbone combines two pairs of Lang Lay strands with one pair of regular lay strands to give you maximum flexibility, good stability, mighty strength. Call your Roebling Distributor — or write for details to Roebling's Wire Rope Division, Trenton 2, N. J.

HERRINGBONE WIRE ROPE

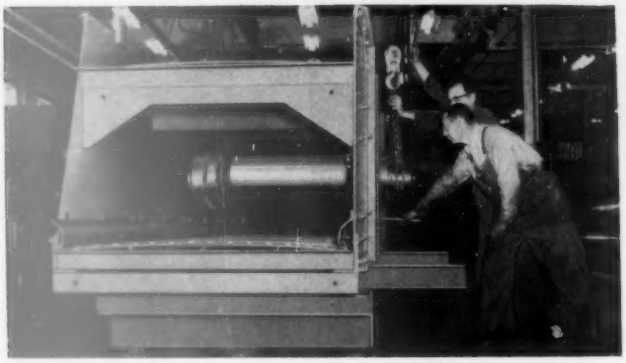
ROEBLING

Branch Offices in Principal Cities
John A. Roebling's Sons Division
The Colorado Fuel and Iron Corporation

This is the place . . .

Yes, right here in the SECO plant, from drawing board to shipping dock, starts the dependability and screening efficiency that pays off when meeting rigid specifications.

that makes the screens . . .



That's because vibrating screens are our business . . . our only business . . . and customer satisfaction is what keeps us in business. SECO uses every means possible to assure this satisfaction in more than 500 vibrating screen models. All phases from design to fabrication and final assembly, are fully controlled here by modern machinery and experienced men . . . the extra margin of safety for your peak operating schedule is a constant consideration at SECO.

that insure your profits . . .

And here's where SECO'S superiority really pays off for you . . . on the job . . . up to 24 hours a day . . . year after year . . . meeting the most rigid specifications with precise sizing accuracy. It will pay you to take advantage of SECO's quarter century of vibrating screen experience.

Send for TWIN BEARING booklet TB-21 and 4-BEARING catalog No. 204

SCREEN EQUIPMENT CO., INC.

Buffalo 25, New York

SECO

"TIME CONSCIOUS" VIBRATING SCREENS

more information, please

Use postcard to receive literature or details on new equipment and products reported in this issue.

PORTABLE DREDGES are described in two pamphlets released by *Service Machinery Company*. Specifications, diagrams, and photographs set forth the qualifications for Dixie Dredge models CD-8, CD-10, and CD-10B. Size of dredges are 8 or 10 in., digging depth is 22 or 26 ft., and working draft is 2.2, 2.0, or 2.3. (301)

A HARD-SURFACING MANUAL FOR EARTH-MOVING equipment has been released by the *McKay Company*. Procedures are given for welding the various elements of earth-moving equipment, and the material needed is listed. Photo-diagrams indicate the location of welds. Two detailed tables, one a descriptive listing of McKay Hardalloys and of application data, and the other a checklist by applications, guide the user in the selection of material and equipment. Another booklet gives the characteristics of McKay electrodes and automatic wires. (302)

RECLAIMING DRY FINES with a cylindrical fabric dust collector is described in a bulletin from *American Air Filter Company, Incorporated*. Bulletin No. 279C gives a description, cutaway diagrams, and tables for the new Model B AMERjet reverse jet fabric dust collector, suitable for cement plants and mineral grinding systems, among other uses. (303)

PORTABLE MOTOR TRUCK SCALES ranging in capacities from 20 tons to 80 tons in single-unit, split-frame, and tandem-connected units are described in a 6-page folder from *Cardinal Scale Manufacturing Company*. The heavy-duty equipment is suitable for weighing dump trucks, tractor-trailers, and off-the-highway equipment. (304)

"SIGNODE AIR-POWER TENSIONERS AND SEALERS," a folder from *Signode Steel Strapping Company*, lists the eight air-powered steel-strapping tensioners, and seven pistol-grip and double-handle sealers available from the company. Charts, pictures, and descriptions of the equipment enable the user to select the right combination for his needs. (305)

VIBRATORY MATERIALS-HANDLING equipment, vibrating parts-handling equipment, power-rectification equipment, mechanical shaft seals, and portable power tools are illustrated and listed in a condensed catalog, No. 605, published by *Syntron Company*. (306)

GAS ENGINE WELDERS for field applications are described in specification sheet available from the Welding Products Division of *A. O. Smith Corporation*. The 300 and 400 amp. d.c. gas-driven welders feature a self-adjusting voltage control. One indicator is set for electrode size, and another for desired current. Voltage then adjusts automatically, giving current and arc stability. The slowdown control automatically cuts speed from 2,150 r.p.m. to 1,050 r.p.m. when the arc is broken, saving gas and prolonging engine life. (307)

"AIR-FLOAT" CONVEYING, developed by the *Kennedy Van Saun Manufacturing & Engineering Corporation,* is described in Bulletin No. 58-K. The system allows gravity to do the work. Air-Float pads are used for aeration of bins and silos to maintain flow for material extraction, and to provide maximum cleanout. The pads are used in flat-bottomed silos with alternating high and low pressure air, to achieve complete homogenization of mixed dry materials. Low-pressure air fluidizes the dry, pulverulent material, and lets it slide over the smooth, porous tile conveying surface, which is inclined 6 to 8 deg. The system handles a variety of materials, including hydrated lime, mineral dust, fly ash, and portland cement. (308)

A PLANT SAFETY KIT aimed at making materials-handling operations safer and more efficient in production, storage, and shipping areas by reminding workers of correct operating procedures for the use of fork-lift trucks is again being offered by *Towmotor Corporation*. The kit contains a pocket-size operator's guide, four safety cartoons designed for posting on bulletin boards, and four lift-truck route posters. The posters are printed in bold letters on a bright background. (309)

JULY **PIT AND QUARRY** **1960**

Insert key numbers found below items on advertising, literature, and new equipment pages. Print company name if not keyed.

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more information, please

Use postcard to receive literature or details on new equipment and products reported in this issue.

LOWBED TRAILERS—single axle, tandem, 3-axle, tilt, and totem-all—are described in a folder available from the *Birmingham Manufacturing Company, Incorporated*. Built for heavy duty in a variety of applications, the models have capacities to 265 tons. **(310)**

"BUCKET ELEVATORS IN CEMENT MILLS," Book 2714, is a 12-page brochure on the *Link-Belt* Type 14 centrifugal discharge bucket elevators and their use in cement mills and similar applications. **(311)**

LIFTING ATTACHMENTS FOR CRANES and hoists for use with pallets, unitized loads, and coils are described in a catalog offering the complete line of *Cady Metal Fabricating Incorporated*. Also included are the Cady "Bartender" racks and spreaders for handling single and bundled bar stock. **(312)**

DIRECTIONS FOR RE-USING ZINC when re-zincing crusher concaves and mills are given in a sheet published by the *Carbonite Metal Company, Incorporated*. Oxidation, which makes the metal sluggish and lumpy, is inhibited by adding Carbonite crusher zinc, according to the directions. If the procedure is followed correctly the material can be used over and over. **(313)**

COST CONTROL methods for the small business owner are covered in a 48-page booklet published by *Dun & Bradstreet, Incorporated*. The booklet contains a step-by-step examination of record keeping, an analysis of figures, and the use of ratios as a means of comparing performance. This information enables the reader to work out a way to examine and control the costs of his business. There is a section given to suggestions for controlling costs. Part of the series of Dun & Bradstreet Small Business handbooks, "How to Build Profits by Controlling Costs" is priced at one dollar. **(314)**

THE OPERATION OF THREE KILNS AND A WASTE HEAT boiler was improved, following the installation of a gas analyzer at a cement company by the *Bailey Meter Company*. The application is detailed in a 4-page report from Bailey. **(315)**

"MAGNETIC IDEAS FROM ERIEZ" summarizes the capabilities of magnetic separators, automation units, and vibratory equipment manufactured by *Eriez Manufacturing Company* in a 48-page booklet released by the company. Bulletin numbers for more detailed descriptions of the units are supplied. **(316)**

ENCLOSED WORM GEAR DRIVES are illustrated and described in "Engineering Catalog HGB," released by *Foote Bros. Gear and Machine Corporation*. Simplified selection procedures and rate tables are featured to enable the user to make a quick accurate identification of the drive which meets a specific requirement. **(317)**

LARGE NUTS MILLED FROM THE BAR are featured in a catalog released by the *Acimet Manufacturing Company*. Dimensions, thread specifications, keg quantities, weights, and prices are tabulated, a table for each nut. Finished and semi-finished hexagon heavy full, jam, and slotted nuts, as well as semi-finished steel nuts, and large hot pressed nuts tapped full, are included. **(318)**

"JUDGING ENGINE QUALITY," a 28-page handbook published by the Caterpillar Engine Division of *Caterpillar Tractor Company*, discusses such factors as design, material, and workmanship; reliability; cost of operation; parts and service availability; trade-in or resale value. Cutaway diagrams illustrate various engine components. **(319)**

Material listed here is FREE unless otherwise noted.

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This unretouched photograph shows a multiple hole blast detonated with Primacord, and hooked up with Primacord M/S Connectors in the trunk line. Note the steady progress of this blast from the point of initiation at the left as indicated by the red line.

Millisecond Delay Blasting with Primacord and

PRIMACORD M/S CONNECTORS

can provide you with these 8 advantages:

One of the primary purposes of millisecond delay is to provide relief between holes or rows of holes. When properly relieved, each succeeding charge "takes the line of least resistance." This condition usually results in

1. Less explosive required than for comparable instantaneous blasting.
2. Better fragmentation.
3. Less vibration and concussion.
4. Better control of throw or displacement.
5. Reduction of "toe" and undesirable backbreak.

Primacord will initiate all cap-sensitive explosives, but is insensitive to detonation by stray electrical currents, sparks or ordinary shock. When Primacord is used for all in-hole priming and to connect all holes, you have these additional advantages:

6. The work of loading the blast can follow the drillers. The holes can stand loaded and Primacord primed until everything is ready for the blast.
7. Danger of a premature blast is minimized. You detonate the Primacord trunk line with fuse and cap or electric blasting cap attached *only when all is ready for the blast.*
8. Less chance of missed holes with unexploded powder and caps in the muck.

The Primacord M/S Connector is a non-electric delay device. It consists of a metal tube containing a delay element in the center with a series of adjacent charges at each end. A piece of Primacord about 12" long is crimped onto each end of the metal tube. The Primacord M/S Connector is constructed symmetrically about the center and therefore functions in either direction. The Connectors are used by simply cutting the Primacord trunk line at the spot where the delay is desired and tying the Connector to the cut end of the Primacord trunk line with a square knot. Primacord M/S Connectors may be obtained for three different delay periods: 5, 9 and 17 milliseconds. They are packed 50 in a cardboard tube, 500 to a case. Manufactured by E. I. duPont de Nemours & Company. Available through all explosives suppliers.

The ENSIGN-BICKFORD COMPANY

Simsbury, Connecticut • Since 1836

MS-2

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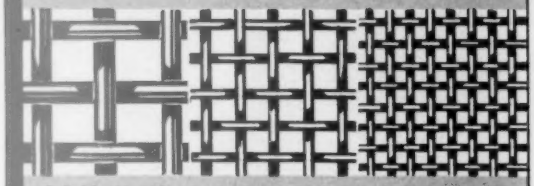
NAT-ALOY
Woven Wire Screens



Reliable Nat-Aloy woven wire cloth is specified throughout industry for maximum screening accuracy and economy. Available in flat surface, lock crimp, double crimp, rectangular and long slot openings. All sizes, meshes and gauges—prompt shipment.

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OIL TEMPERED WOVEN WIRE CLOTH
★ GREATER RESISTANCE TO ABRASION
★ MORE TONNAGE AT LOWER COST
★ FEWER COSTLY CHANGE OVERS

Write for information. Also stainless steel wire screens.

NATIONAL WIRE CLOTH COMPANY
252 W. Fairfield Ave., St. Paul 1, Minnesota

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WEIGH THE FACTS . . .
You're Way Ahead with
MURPHY-CARDINAL
Welded Steel MOTOR TRUCK SCALES

- LONGER LIFE
- MORE ACCURATE WEIGHTS
- LOWER INSTALLATION AND MAINTENANCE COSTS
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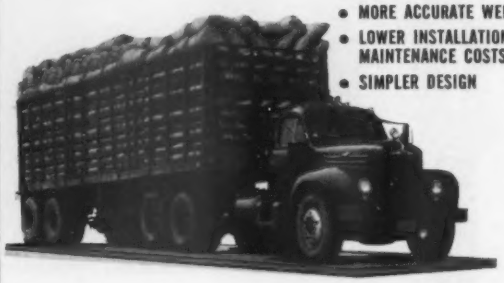

Murphy-Cardinal Scales combine the strength of high tensile STEEL and the simplicity of ADVANCED DESIGN to bring you greater all 'round economy. Murphy-Cardinal's Double Link Suspension Bearings absorb heavy impacts and provide a sturdy, free floating platform of either concrete or timber. Capacities and platform sizes are available on request.

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Cardinal
SCALE MFG. CO.
P. O. Box 151 — Webb City, Mo.

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PIT and QUARRY on your desk
is like a full-time consultant
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PLATEGRIP
PLATE FASTENERS FOR CONVEYOR BELTS

Make strong dust-tight, water-tight joints in belts of any width. Special design spreads tension uniformly across belt, allow natural troughing of belt and assures smooth operation over flat, crowned or take-up pulleys. Sizes for belts of from 1/4" to 1 1/2" thickness. *Write for Catalog Sheet.*

ARMSTRONG BRAY & CO.
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INCLUDING URANIUM & LIMESTONE — ANYWHERE

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GROUT HOLE DRILLING

Skilled crews and complete stock of core drills and accessory equipment maintained at all times

Core Drill Contractors for more than 60 years

JOY MANUFACTURING CO.
Contract Core Drill Division
MICHIGAN CITY, INDIANA

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HEIL-TEC dump trailers

Exclusive design cuts dead weight...lets you haul up to 4,000 lb more payload

HY-SPILL dump trailers increase the versatility of your hauling rig. *Exclusive, patented design* holds front tandem wheels on ground during dumping, provides 38 to 40-in. spill height from end of body floor to ground. Clearance is ample for high stockpiling, dumping into above-ground hoppers and paving and spreading machines.

Exclusive design of TEC frameless dump trailers—engineered for maximum strength and stability with minimum tare weight—saves 1,000 to 2,000 lb per unit compared to conventional frame-type trailers. TEC frameless dump trailers can be furnished in long lengths to permit forward location of lower fifth wheel on tractor, and also obtain long extreme axle spacing as required in many states. *Payload can be increased as much as 4,000 lb* in certain states . . . and even more where longer axle spacing is desirable.

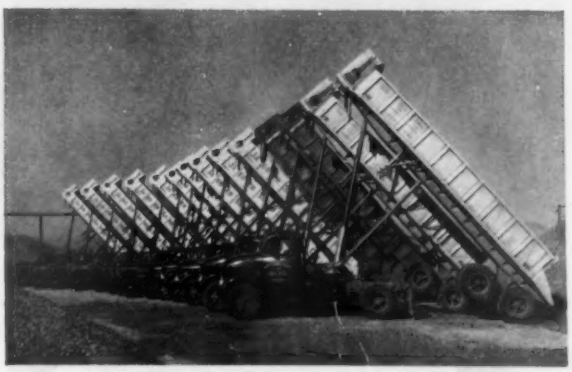
Aluminum boosts payload

With aluminum construction, you can haul an extra 2,400 to 3,000-lb payload. Weight-saving HY-TEC and HY-SPILL design and aluminum construction actually can soon pay for itself in increased income.

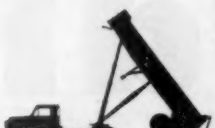
TEC builds single axle and tandem semi-trailers for use with either single axle or tandem tractors. Single axle trailers are available in body lengths from 16 to 28 ft, and tandem axle units in lengths from 20 to 34 ft.

TEC design gives you on-the-job advantages

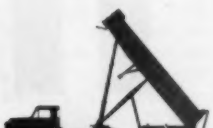
- **Exclusive HY-SPILL design permits dumping into high hoppers, paving and spreading machines.**
- **Body can be raised or lowered while moving, with better stability than any other hauling unit.**
- **Trailer can be dumped while jackknifed, speeds dumping and turn-around in tight places.**
- **Excellent balance and maximum stability let you haul and dump safely and efficiently on rugged job sites and off-highway conditions . . . anywhere your truck can go.**



Fleet of HY-TEC dump trailers operated by a large Midwestern sand and gravel producer. First two units in foreground are aluminum.



HY-TEC FRAMELESS TYPE
U.S. Patent No. 2,846,267



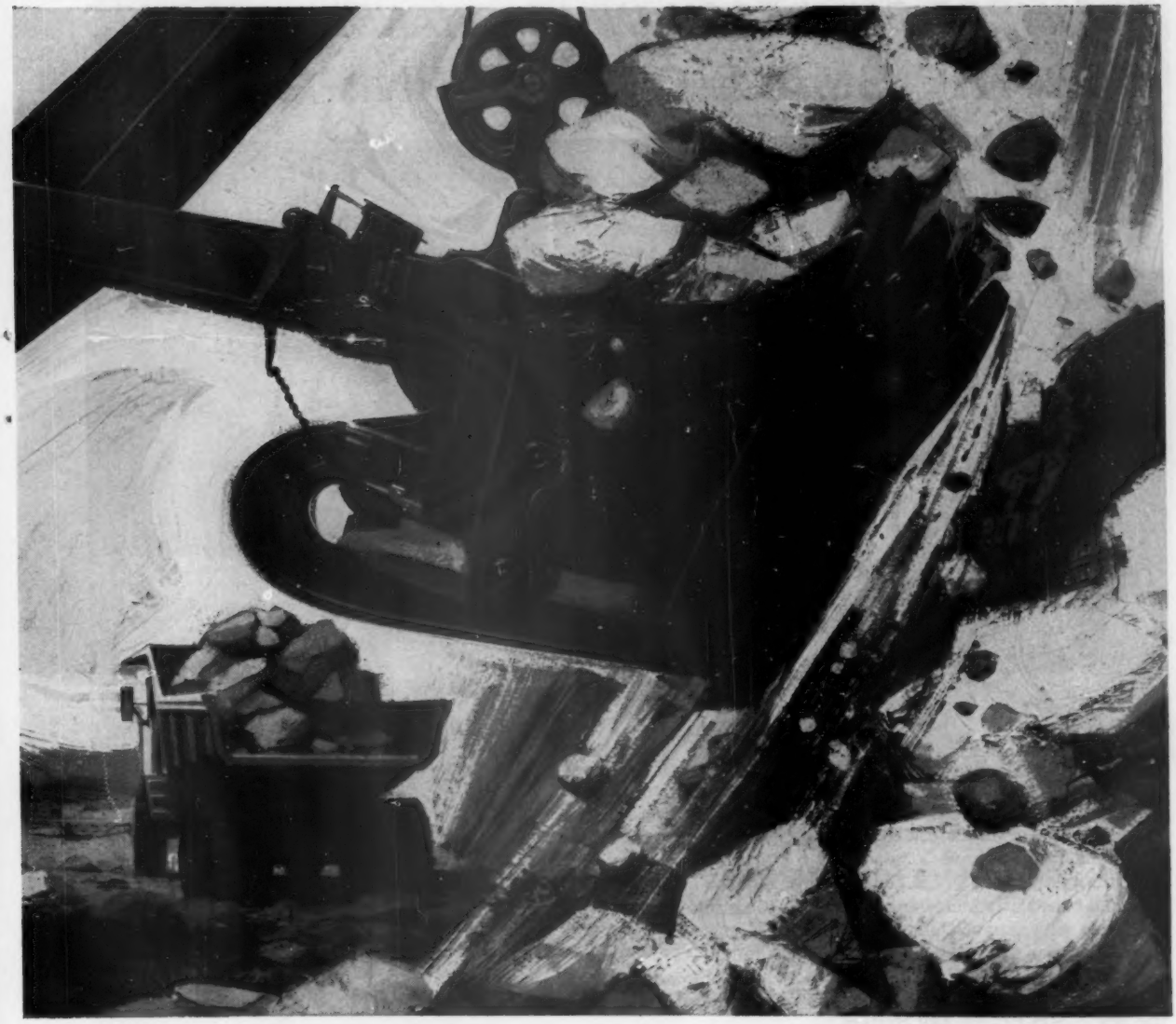
HY-SPILL FRAMELESS TYPE
(Available Only From Heil)
U.S. Patent No. 2,853,341

TEC Division **THE HEIL CO.** DUMP BODIES and HOISTS

TEC Division, 1285 West 70th Street, Cleveland 2, Ohio

TANK-TOUGH LINK-BELT SPEEDERS...

treat rock like dirt!



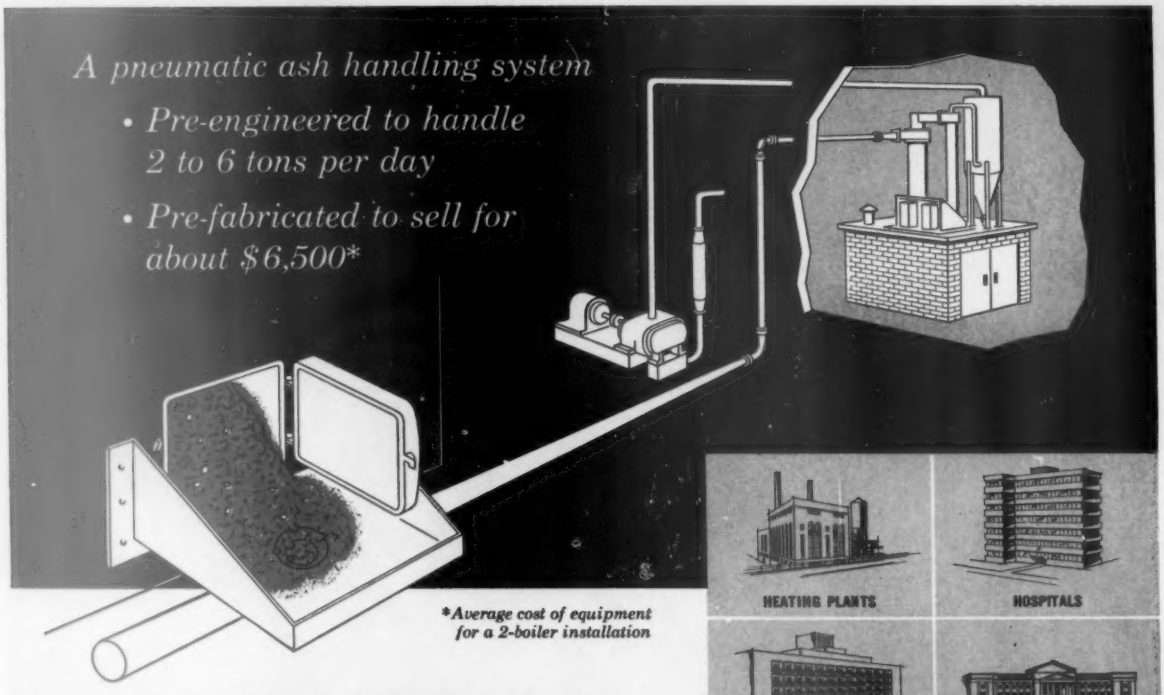
All-welded and stress-relieved — stamina, strength and guts to shrug off years of hard work! Tough, impact-loving Link-Belt Speeders thrive on the roughness of rock. They're built for rugged duty with all-welded, stress-relieved, jig-bored frame assemblies. Precision boring permits parts interchangeability, steps up machinery strength under stress. Extra-size, heat-treated machine components transmit more of rated hp to swing, hoist, travel, slam the dipper in. All-welded shovel-booms and dipper sticks . . . all-manganese buckets soak up strains without a shudder. Shafts, gears, bearings are precision aligned, stay aligned. No shims needed. Clutches are self-compensating for heat and normal lining wear.

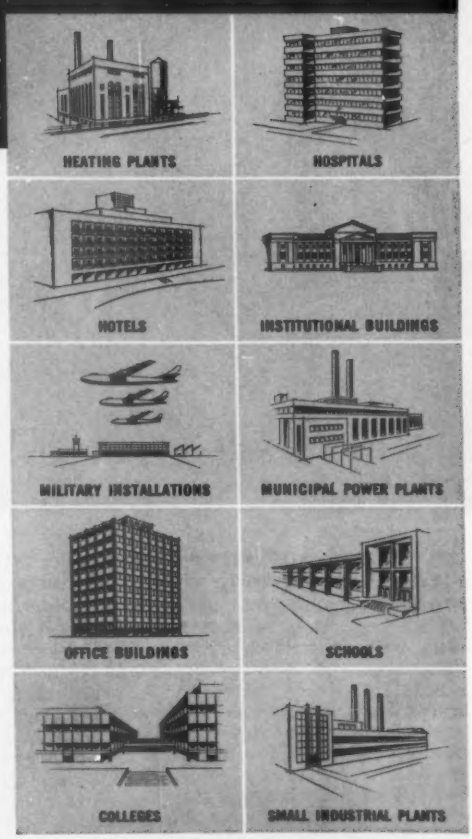
Split-second Speed-o-Matic controls cut operator fatigue—power steer and more usable hp spurt rock output! Nudge a Speed-o-Matic power hydraulic control lever. Feel this brute obey! Trigger-fast shovel reflexes produce up to 25% more cycles per 8-hour shift. And finger-tip Speed-o-Matic power steering gives you double-quick maneuverability in, out, around blast rock, crusher or truck. No sloppy mechanical wear and repair. Payoff: top-profit rock production for *years* . . . at rock-bottom cost. For information on the complete line of shovels and cranes (½- to 3-yd., 8- to 75-ton capacities), see your distributor or write LINK-BELT SPEEDER CORPORATION, Cedar Rapids, Iowa. 101-60-N

LINK-BELT SPEEDER

It's time to compare . . . with Link-Belt Speeder

THE FIRST BIG BREAK IN ASH HANDLING COSTS
FOR THE SMALL COAL BURNING PLANT


A pneumatic ash handling system
• Pre-engineered to handle 2 to 6 tons per day
• Pre-fabricated to sell for about $6,500*
*Average cost of equipment for a 2-boiler installation



Engineers of small coal burning plants—Heating Plants, Hospitals, Hotels, Institutional Buildings, Military Installations, Municipal Power Plants, Office Buildings, Schools, Colleges, Small Industrial Plants—have long wished for a small, practical ash handling system that would eliminate much of the inconvenience, dust and constantly increasing labor costs of manual ash removal. Available ash removal systems could not be economically justified where less than 10 tons of ash per day was produced.

Aware of this need, The Allen-Sherman-Hoff Company assigned its best engineering talent to untangle the problem. The result: the *new* A-S-H ECONO-ASH System.

A major step in solving this problem was pre-engineering. Use-proved designs of major components were re-engineered to handle smaller quantities; new equipment was designed and tested. One requirement was basic: cost reduction without loss of efficiency. Installation, for example, was made so simple that it can be made with local labor.

We've prepared a 4-page brochure to explain the *new* ECONO-ASH System—how it operates, its variations and its advantages. We'll send it to you immediately upon request. It also lists the A-S-H Sales Engineers—one is near you—who will be glad to show you how, in most installations, the *Econo-Ash will pay for itself in two years or less.*

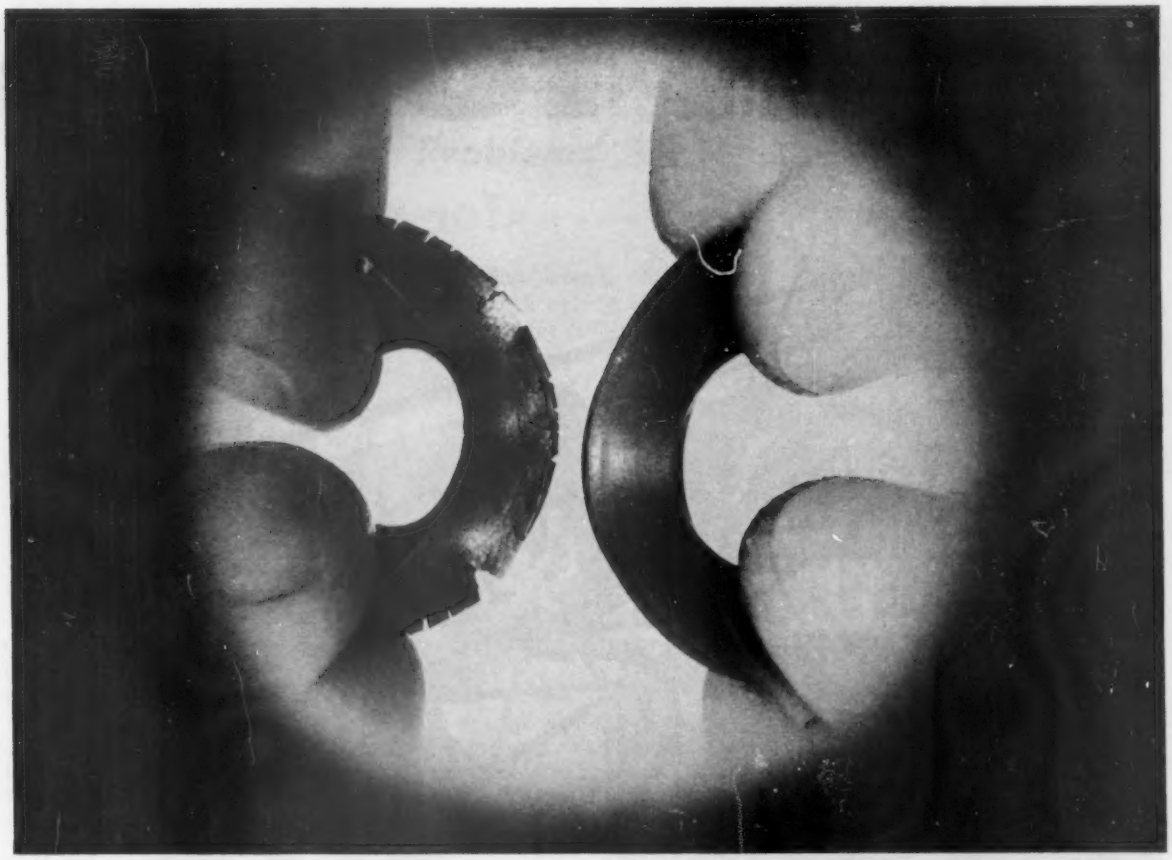
MATERIALS HANDLING SYSTEMS

ASH

the **Allen-Sherman-Hoff** company

245 E. Lancaster Ave., Wynnewood, Pa.

Offices and representatives in principal cities



Two torque converter seals, subjected to 300 hours of service at 325° F., show added protection of D-A Torque Fluid. Seal on left, used with ordinary torque fluid, is brittle and cracked, has shrunk excessively. Seal on right, used with D-A Torque Fluid, remains resilient and reveals no cracks or deterioration. It was protected by D-A's *exclusive* preservative.

only D-A TORQUE FLUID gives these SIX advantages . . .

1. 4% to 5% more efficiency with D-A Controlled Viscosities

2. More high-temperature protection . . . will not thicken excessively

3. Better cold-weather performance with −35° F. pour point

4. Oxidation stability . . . stops sludge, varnish, corrosion

5. Exclusive D-A seal preservative prevents seal trouble, leakage

6. Longer operation periods between lubricant changes

For better performance, less maintenance, longer equipment life, it pays to use D-A Torque Fluid in heavy-duty automatic transmissions, hydraulic systems and rotary compressors. Contact your local D-A representative for full details on D-A Torque Fluid. Prove to yourself: you can boost your profits with D-A.

Lubricating heavy-duty equipment across the nation since 1919.

D-A LUBRICANT COMPANY, INC. • INDIANAPOLIS 23, IND.

Built tough

for round-the-clock service in grueling applications

Pre-Bilt conveyors are available in belt widths of 18, 24, 30 and 36 inches. Truss and channel structural frames are designed to AISE standards for spans up to 50 ft. Supporting bents, chutes and other accessories are standardized.

All these advantages from selection to erection with pre-engineered units

EASY SELECTION from standardized Link-Belt components. Your Link-Belt sales engineer will help you select the right combination.

ON-THE-SITE QUOTATIONS by a trained sales engineer. He will prepare a prompt quotation on all components necessary for efficient operation.

LOW FIRST COST. Pre-engineered, shop-assembled components, prompt delivery, fast erection time—all result in lower initial costs.

LOW OPERATING COSTS. Due to rugged design, maintenance normally consists only of lubrication. More economical based on cost per ton handled.

QUICK DELIVERY. Pre-Bilt sectional belt conveyors are manufactured and shipped from one of nine plants located nearest your operations.

FAST, LOW-COST INSTALLATION. Simple construction facilitates field assembly, reducing time and costs of erection.

LINK-BELT Pre-Bilt belt conveyors bring savings from the start

Speed, economical operation and dependability—conveying features required in every industry—are provided by Pre-Bilt Sectional Belt Conveyors. They stand up in the most rugged, full-time operations. And normally the only maintenance required is lubrication.

The same engineering design which has produced some of the world's outstanding conveyor systems is applied to Pre-Bilts. Standardized, shop-assembled components are selected to specifically fit your installation. Simple construction provides ease of handling and erection.

No other conveyor offers such rugged design and economy of operation in bulk materials handling. Call your nearby Link-Belt office for complete information. *Or write for Catalog 2779*, a new "Idea Book" for cutting costs with Link-Belt Pre-Bilt sectional belt conveyors.

LINK-BELT

BELT CONVEYOR EQUIPMENT

LINK-BELT COMPANY: Executive Offices, Prudential Plaza, Chicago 1. To Serve Industry There Are Link-Belt Plants and Sales Offices in All Principal Cities. Export Office, New York 7; Australia, Marrickville (Sydney); Brazil, Sao Paulo; Canada, Scarboro (Toronto 13); South Africa, Springs. Representatives Throughout the World. 15,192

Legal Decisions

On Industry Problems

By LEO T. PARKER
Attorney at Law
Cincinnati, Ohio

Operator of "Nuisance" Obligated

A FEW weeks ago a higher court settled a long debated legal question, as follows: "Is a new purchaser of a cement plant obligated by court nuisance judgments previously rendered against the seller of the plant?"

This higher court definitely answered this question in the affirmative.

For illustration, in *Riblet v. "X" Cement Company,* 345 Pac. (2d) 173, the testimony showed these facts: "X" Cement Company bought a cement plant from the "Y" Cement Company. Previously, Riblet the owner of a residence located near the cement plant, had sued the latter company for damages allegedly resulting from cement dust deposited on his premises. He claimed that it has interfered with the use of his property and with his mode of life, thus constituting a nuisance.

This higher court held that the "X" Cement Company was bound by prior court decisions against the "Y" Cement Company, holding that Riblet's property was damaged by the cement dust. The court said:

"By prior judgment, the law of the case is that, if the discharged cement dust interfered unreasonably with the Riblets' use and enjoyment of their property, the dust constituted a nuisance and the Riblets were entitled to compensation for the damages sustained thereby. No different plant use was shown."

Gravel Deposits are Valuable

All courts agree that sand and gravel deposits are valuable assets to real property. Therefore, the value of these deposits will be taken into consideration when the land is appropriated for public purposes.

For instance, in *Easement for Highway Purposes v. 162 N. E.* (2d) 190, a jury awarded one R. $29,600 for 9.3 acres of land appropriated by the state for highway purposes. This award was made because there was competent evidence as to the value of the gravel-bearing land, predicated upon the estimated amount of the gravel deposited.

Although the director of highways fixed the value of the land at $4,986.60, the higher court upheld the jury's verdict, quoting:

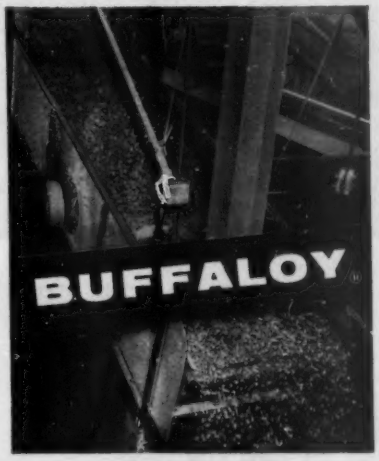
"The court charges you that you can consider the value of the gravel deposit in place, in determining the value of the gravel-bearing land of the owners. The . . . gravel deposit in the land and the value thereof should be considered by you insofar as it affects the market value of the land in determining the value of the land."

Therefore, although the director of highways contended that the highest and best practicable use of this land was for farming purposes, the jury took into consideration the additional value of the land due to its gravel deposits.

For comparison, see *J. D. V. & S., Inc. v. Commonwealth,* 162 N. E. (2d) 269. In this leading case, decided only last month, the higher court held that where a sand and gravel pit was appropriated by the state, the jury must determine the fair market value of what was taken and diminution in fair market value of what remained in the light of the relevant characteristics and uses of the property. This court said:

"The petitioner (land owner) was entitled to give the jury a full description of the property as a sand and gravel pit with reserves. The jury were to determine the fair market value of what was taken and the diminution in fair market value of what remained."

SURE WAY TO CUT
SCREENING COSTS



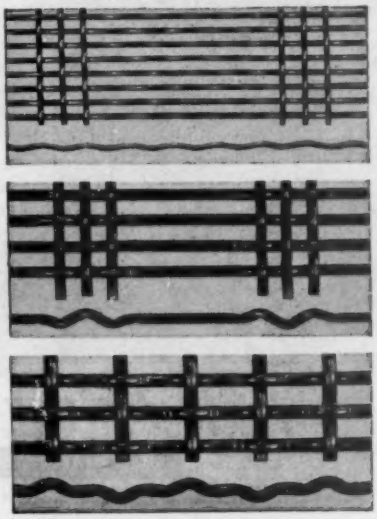
anti-abrasive
VIBRATOR PANELS

You'll be time and money ahead with Buffalo Anti-Abrasive Screens. Woven from a special formula, high carbon steel wire, here are superior panels that provide many extra hours of service. Resistance to abrasion and ability to cope with heavy shock loads are unequalled, even by higher priced panels.

Long experienced in serving the mineral aggregates industry, Buffalo Wire Works possesses the necessary skills to produce a wide selection of weaves and mesh sizes, with virtually any type of edging, for meeting your needs precisely.

You'll want the whole story in New Bulletin 600P. Write.

BUFFALO WIRE WORKS COMPANY, INC.
526 Terrace, Buffalo 2, N. Y.



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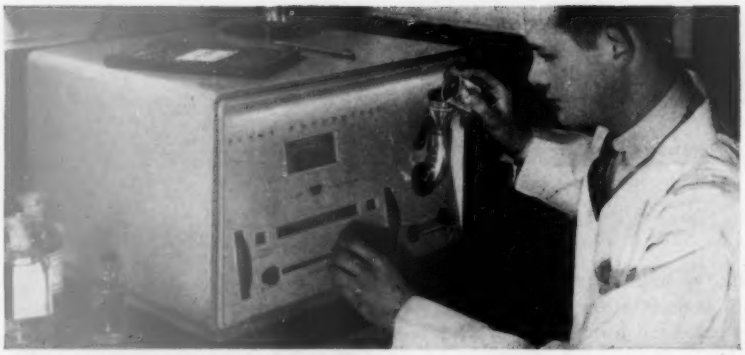

ANALYZE FOR Na_2O or K_2O WITH ACCURACY IN ONE MINUTE

In analyses for alkalies, such as sodium and potassium oxides under ASTM Spec. C114-51T, the Perkin-Elmer Model 146 Flame Photometer delivers reliable results. Internal standard or direct-intensity reading from AC drift-free electronics gives fast routine analyses, accurate to within one percent.

The Model 146 operates with any commercially-available gas and air, is designed for simplified, convenient operation. It uses regular electric utilities, and includes rugged self-contained meter and phototube circuits.

Write for Perkin-Elmer's illustrated brochure on the Model 146 Flame Photometer.
Enter 268-A on card, page 257

INSTRUMENT DIVISION
Perkin-Elmer Corporation
NORWALK, CONNECTICUT

FOR LIMESTONE

FOR CRUSHED ROCK

Webster BUCKET ELEVATORS

WEBSTER Bucket Elevators can handle practically any capacity requirement. Made in centrifugal, perfect or gravity discharge, continuous bucket, and super capacity types. Buckets can be furnished malleable iron, duramal or steel.

The rough, tough service encountered in rock products plants poses many problems for plenty of producers—until they place those problems in the hands of WEBSTER Engineers.

WEBSTER Bulk Materials Handling Systems will keep your production on the move—efficiently and economically—because they are based upon "know how" gained through 84 years' experience. All components of WEBSTER equipment are manufactured and assembled in our own plant.

Write for Catalog BE-55

Webster MANUFACTURING, INC.
DEPT. Q-70, TIFFIN, OHIO
BULK MATERIALS HANDLING EQUIPMENT
SINCE 1876
Offices in all Principal Cities

Enter 268-B on card, page 257

Members of Jury Must Be Impartial

A few weeks ago a higher court reversed a jury's verdict because the testimony proved that one member of the jury had been a prior employee of a company closely associated with one of the parties having an interest in the law suit.

For illustration, in *G. Sand and Gravel Company v. G.*, 346 Pac. (2d) 110, it was shown that a contractor named G. had a contract with an ordnance depot to perform certain concrete, and other work. The G. Sand and Gravel Company submitted to G. a bid of $1 per yard for crushing the first 20,000 yd. of rock and 75 cents per yard for additional yardage above that amount. In subsequent litigation, officials of the G. Sand and Gravel Company claimed they contracted to produce 55,800 yd. of crushed rock for G., but the latter claimed that the agreement was for an indefinite amount. The contract between the company and G. was not in writing, except as to the bid itself.

After the production of some 10,000 or 11,000 yd., the operation was stopped. During the trial the jury returned a verdict for the company.

G. appealed to the higher court and proved that one of the jurors was an employee of the ordnance depot and had taken part in the preparation of the plans and specifications with which the contract was connected.

In view of this evidence, the higher court reversed the jury's verdict, and said:

"The very contract in question was a part of the knowledge which the juror possessed. We agree that the right to trial by fair and impartial jurors is a matter which is, and should be, jealously guarded by the courts, and that juries should consist of impartial men."

Validity Of Fair Labor Standards Act

An official of a concrete block manufacturing plant asked an important legal question, as follows: "Can a corporation lawfully make an employment contract with employees whereby the latter are paid wages less than specified by the Fair Labor Standards Act?" The answer is no.

For example, in *Watkins v. H.*

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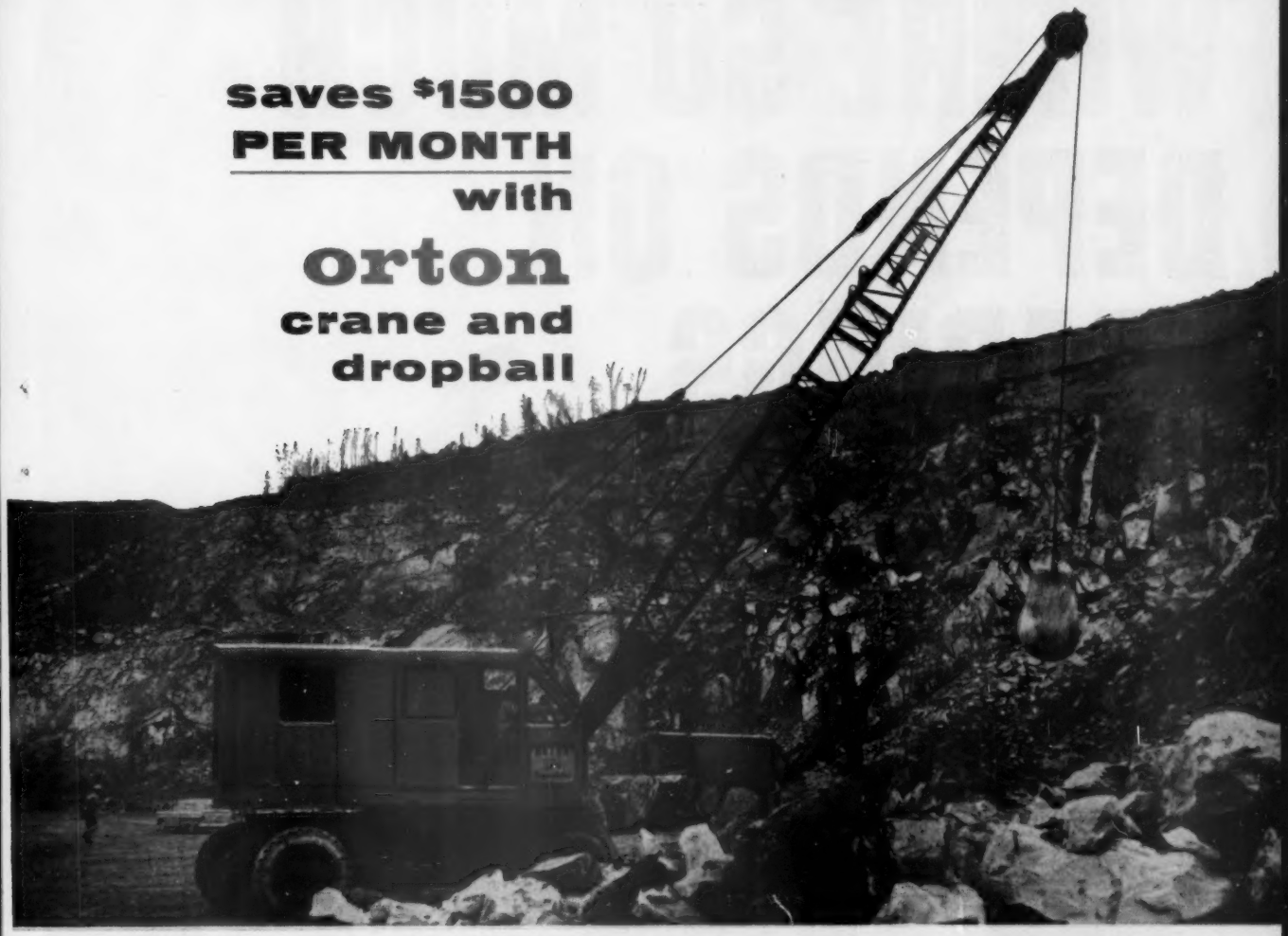
saves $1500 PER MONTH with orton crane and dropball



Study reveals 19.96% savings over conventional plugger and explosive method

In a series of exhaustive tests in an open pit operation, a large mining corporation has recently determined that the cost of breaking rock can be cut by over $18,000 per year with the use of an ORTON Crane operating a dropball.

The tests considered all expenditures including cost of equipment, labor and maintenance.

Intangibles such as reduced air consumption, plugger replacements, decreased shovel maintenance, less time loss at the crusher were *not* included in the tests. These factors are considered worth many more thousands of dollars.

ONE IMPORTANT POINT WAS OBVIOUS IN THE REPORT: *The ability of a compact, mobile crane to stand up under this shattering work, continuously, shift after shift with little or no maintenance or down time is a highly significant factor in these savings!*

For facts about this remarkable crane—or other units up to 250-ton capacity, write for brochure.

Note easy accessibility to diesel engine. ALL ORTON cranes have smooth, shock-free, Torque-Control fluid clutch, finger-tip, air-operated controls, anti-friction bearings throughout—and are also available in *completely hydraulic* models.

orton

CRANE AND SHOVEL CO.
608 S. Dearborn Street CHICAGO 5, ILLINOIS
THE MOST POWERFUL NAME IN CRANES

WHERE SO MUCH DEPENDS ON BEARINGS....

...YOU

This Bucyrus-Erie Wheel Excavator is priced at millions of dollars and well worth it! But any one of a number of bearings costing from $10.50 to $500.00 can delay operations for costly hours or days.

Bucyrus-Erie depends on Rollway Bearings in many of the critical spots.

If you're looking for high life expectancy under shock loads and continuous service, start with our complete product line catalog PL-559. Rollway Bearing Company, Inc., Syracuse, N. Y.

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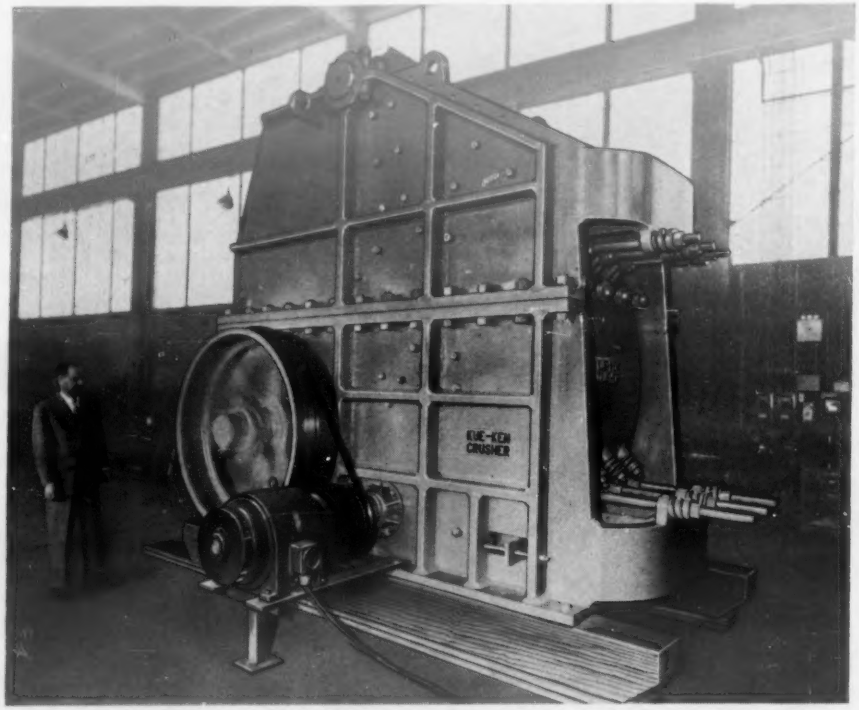
CAN DEPEND ON ROLLWAY BEARINGS

Radial and Thrust Cylindrical Roller Bearings

KUE-KEN® greater leverage permits small motor



#160 — 48"x42" KUE-KEN Jaw Crusher mounted on skids NOT FASTENED TO FLOOR and running at 275 RPM, the operating speed. A 30 HP normal duty squirrel cage motor starts this crusher with a single vee belt. Only 17 HP is required to run crusher at full speed. High efficiency and smooth running of KUE-KEN Crushers is clearly shown by above performance. 33 sizes of KUE-KEN Crusher available from 12"x7" to 48"x48".

WRITE FOR CATALOG

KUE-KEN designs maximum leverage where it counts most . . . at the top of the swing jaw for crushing large rocks.

The swing jaw is supported on the stationary hinge pin on the center line of the crushing zone. The pendulum type jaw swings in an almost straight line to crush rock squarely without rubbing. JAW PLATES LAST AT LEAST 5 TIMES LONGER AND FAR LESS POWER IS USED.

NO POWER IS WASTED in lifting heavy swing jaws as in all other crushers and power is not wasted in wearing out jaw plates.

KUE-KEN does not require heavy flywheels. A single lightweight flywheel permits the use of normal duty squirrel cage motors.

By eliminating the useless lifting of heavy reciprocating parts, **KUE-KEN** runs at higher speed for higher capacity and a more uniform product.

PRECISION MACHINED TOGGLE MECHANISM SEALED IN FILTERED OIL BATH!

Wear and friction reduced to the absolute minimum. More power available for crushing rock.

PATENTED TRAMP IRON RELEASE!

Simple, adjustable safety release integral with flywheel. No shearing or breaking parts. Positive protection against tramp iron. Production resumed in minutes.

KUE-KEN® CRUSHERS

"Crushing without Rubbing"

STRAUB MFG. CO., INC. 8381 Baldwin St., Oakland 21, Calif.

Jaw Crushers — Gyratory Crushers — Overhead Eccentric Crushers
Revolving Screens — Classifiers — Feeders — Rib Cone Ball Mills
Concentrating Tables — Vibrating Screens

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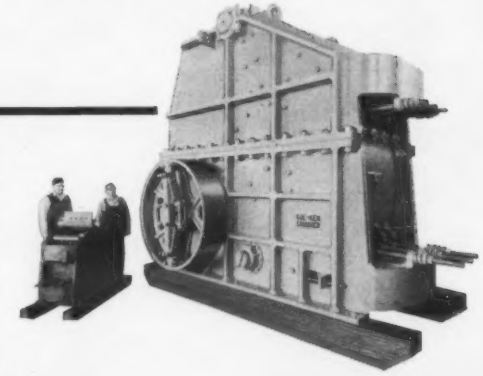
BUTTE, MONTANA . . . . . Hall-Perry Machinery Co.
VANCOUVER, B. C. . . . . Universal Equipment Co.
SALT LAKE CITY, UTAH . . . . . Lund Machinery Co.
SAN ANTONIO, TEX. . . . . Closner Equipment Co.
LOS ANGELES, CALIF. . . . . Garlinghouse, Froman Co.
PORTLAND, OREGON . . . . . Air-Mac, Inc. of Oregon
BISMARCK, NORTH DAKOTA . . . . Midwest Equipment Co.
PHOENIX, ARIZ. . . . . Road Machinery Co.

Pennsylvania Crusher Division, Exclusive Licensed Eastern Manufacture and Distributor, 323 S. Matlack St., West Chester, Penn.
Armstrong Whitworth (Metal Industries) Ltd., Authorized Licensed Manufacturer and Distributor, Close Works, Gateshead-upon-Tyne 8, England



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Company, 151 Fed. Rep. (2d) 311, the higher court held that any wage formula or employment contract is illegal if it creates a fictitious regular rate below the minimum wages specified by the Fair Labor Standards Act.

Also, the Supreme Court of the United States has held that a company which produces any merchandise for interstate commerce must pay wages specified by the Fair Labor Standards Act.

For illustration, in *Mabee v. White,* 66 S. Ct. 511, it was shown that a company shipped its product to only 45 out-of-state customers out of a total of 9,000 customers.

The Supreme Court, in a majority opinion, held this company is within the scope of the Fair Labor Standards Act, and it must pay all its employees minimum wages specified by the Fair Labor Standards Act.

Also, see *Walling v. H. C. Company,* 152 Fed. Rep. (2d) 622. Here it was shown that a cement company made a contract with its employees under the terms of which the employees were paid a regular basic rate for the first 40 hours of any work week, plus one and one-half for all overtime. Also, the employer guaranteed that each employee should receive not less than the minimum wage specified by the Fair Labor Standards Act.

The higher court held this employment contract valid and not an unlawful contract because fixing weekly minimum payments did not evade the Fair Labor Standards Act.

Law Of Surety Contracts

In all states the law is established that a contract to pay another's debt is void unless it is in writing. On the other hand, this law is not applicable if a person guarantees that he will personally pay the debt, although for the benefit of another person.

For illustration, in *Y. Cement Products Company v. Williamson,* 335 Pac. (2d) 1, the testimony showed these facts: The Y. Cement Products Company sued one Williamson for the installation of concrete irrigation pipe on a parcel of land. Williamson attempted to avoid liability on the plea that his contract to pay the installation price was not in writing and hence void, particularly because the pipe was installed on real estate owned by one Nolan. However, the testimony showed that Williamson promised personally to pay the installation cost, and he did not promise to pay "if" Nolan failed to pay. Hence, the higher court held that Williamson must pay the agreed installation to the Y. Cement Products Company.

Value of Patents

A reader wrote, as follows: "In 1959 I entered into a contract with the owner of a patent involving concrete forms. I paid the patentee $2,000 plus certain royalties for the exclusive right to make and sell the invention in this state. This patent is a valuable improvement over the older patent for concrete forms. I have been doing fairly well with these patented forms, and have a crew working for me. Now I learn that a contractor is building and using these patented forms in this state. He is underselling me. I

Long-hole drilling made easier—

more profitable with

ROPE thread BRUNNER & LAY tools

If it's deeper holes you are after, you can't buy more productive tools than the rope-thread Brunner & Lay assembly . . . carbide Rok-Bits, Couplings, Carbo-Rok Sectional Rods, Striking Bars—everything from chuck to muck.

Solid rope thread connections ensure greater rod rigidity for deeper drilling. Easy hand uncoupling. An unbeatable drilling unit designed and made to work together. Request complete catalog #759 from your local Brunner & Lay dealer, or our nearest plant.

Brunner & Lay, Inc., 9300 King St., Franklin Park, Ill. *Est. 1882.* Plants & conversion shops: Albuquerque, Asheville, Birmingham, Dallas, Dorchester (Boston), Long Island City, Los Angeles, Philadelphia, Sacramento, Seattle, Yardley (Spokane), Lachine, Que.

Brunner & Lay CARBIDE ROK-BITS • DRILL RODS INTRASET STEEL • COUPLINGS, ADAPTERS, SECTIONAL STEEL, STRIKING BARS • STANDARD OR ROPE THREADS • MOIL POINTS, CLAY SPADES, ASPHALT CUTTERS, ETC.

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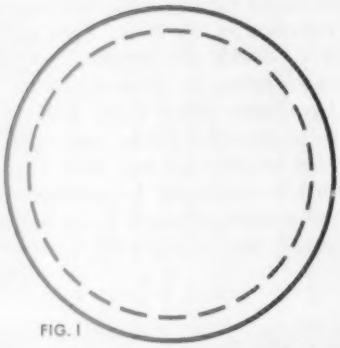
FIG. 1

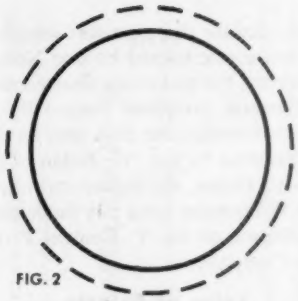
FIG. 2

which dotted circle is the larger?

Your eyes tell you that the dotted circle in figure 1 is greater in diameter than figure 2. Actually, the figures are of equal diameter.

Many of us are fooled by an illusion of another sort; the illusion that all replacement parts are of equal value. This illusion can lead to one of the most costly investments one can make.

You can prove this to yourself by ordering Columbia Armor-Tough Manganese Steel replacement parts. Then COMPARE the cost of down time, the cost per ton, the cost per week of service. No matter how you measure it, you will find that Columbia components are your best investment . . . because Columbia parts are "beefed up" where it counts, where rock meets metal.

Don't be fooled by the value illusion. Insist on the savings that only extra Columbia quality can assure you.

Send for the new illustrated Columbia Bulletin No. 1063, featuring crusher, tractor, shovel, bucket replacement parts.

Columbia

COLUMBIA STEEL CASTING CO., Inc.

933 N. W. Johnson, Portland 9, Ore. * Ph.: CA 7-0555

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would like to know the proper course to take with this contractor who is infringing on this patent. Can I sue this contratcor for infringement?"

The answer is: The contractor undoubtedly is liable as an infringer, provided that claims of the patents are sufficiently broad to cover the form of the invention now being constructed, sold, and used by this contractor without proper authority from you, the licensee, or the patentee. It is well for you to know that users of a patented invention are liable as infringers. Moreover, all other persons who have contributed to the infringing acts of either or both of the contractor and users are liable as co-infringers.

Generally speaking, the license contract, for which you paid $2,000 plus royalties, should have included a clause obligating the patentee to prosecute infringers and protect your rights in your state in which you have the exclusive rights on the invention.

Of course, it is unprofitable for you to pay $2,000 for rights which another contractor appropriates without payment of license or royalty fees.

In my opinion the proper thing for you to do under the circumstances is first to obtain definite information whether or not the concrete forms being made by the competing contractor, actually infringe on the claims of the patent. If you find that infringement exists, you should immediately contact the patentee and demand that he protect your interests and file a suit to stop infringement.

Of course, since you are a licensee, you are privileged to institute suit against the infringers in your territory, if the patentee refuses to protect your interests. In such a suit the court will decide whether or not the patent is valid. In many instances in the past, courts have held patents invalid. Hence, if this happens in your case, you will be out a great deal of money, time, and other incidental expenses. Therefore, your license contract should contain a clause obligating the patentee to file and prosecute these suits.

Obviously, a study of your license contract should impart information whether or not the patentee

agreed to prosecute infringers. You have paid for the exclusive right to make, sell, and use the patented structures and obviously you may anticipate protection by the courts in this matter if the patents are sufficiently basic thoroughly to protect the inventions on which infringement is believed to exist.

$150,000 Damages

Some higher courts approve what, at first hand, appears to be unusually high injury damage allowances. These courts base their damage allowances, first, upon the character of the injuries, and, second, upon the present devaluation of the American dollar.

For illustration, in the late case of *Richey v. Service,* 28 So. (2d) 284, the court said:

"The award of the lower court, if made a few years ago in a case of this character, would have been adequate. It is not so under present economic conditions . . ."

Also, see *Moore v. R. M. C. Company,* 329 S.W. (2d) 14. Here are the facts: At about 11 a.m. a police officer named Moore, received serious injuries when the motorcycle he was riding was struck by a concrete truck owned by the R. M. C. Company and driven by one W. At that time Moore was in the performance of his duties as a sergeant with the K. Police Department, and W. admittedly operated the truck in furthering the business of his employer, R. M. C. Company.

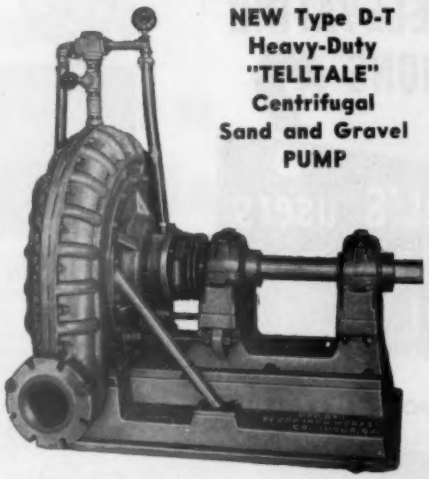
In subsequent litigation the jury decided that W.'s negligence in driving the truck caused Moore's injuries and held the R. M. C. Company liable in $200,000 damages to Moore.

In view of the fact that Moore still lives and eventually may perform ordinary work, the higher court reduced the damage allowance to $150,000 and said:

"The driver of the R. M. C. truck, Mr. W., testified that the truck was in good mechanical condition. The evidence would seem sufficient to support the final judgment of $150,000, and that amount does not violate the rule of reasonable uniformity."

For further comparison, see *Aly v. Terminal,* 119 S. W. (2d) 363. Here a verdict of $85,000 was awarded to a 42 year-old-person

WHY "TELLTALE" PUMP USERS HAVE PRIORITY ON PARTS



NEW Type D-T Heavy-Duty "TELLTALE" Centrifugal Sand and Gravel PUMP

In a showdown, the already "Telltale" owner's order gets priority over an order for a new pump. That's a firm "Telltale" policy—insurance against downtime along with lower parts-changing time, higher production, longer wear—minimum cost of production per yard.

AS LOW IN DOWNTIME AS IT IS HIGH IN PRODUCTION

"Telltale" is the only pump that warns when it's time to reline. Air sucked through periphery ports causes pumps to lose its prime. Pumping stops. Water leaking through the ports signals that the shell liner and the surrounding belt of packing have worn through.

Available with either tough semi-steel or best-in-the-long-run Ni-Hard wearing parts in 4", 6", 8", 6 x 8" suction and 8 x 10" suction. Now available also in either alloy, 45 and 90° extra-heavy long-radius flanged elbows. Write for Type D-T Heavy-Duty folder and prices.

Pekor Iron Works, Inc.

ESTABLISHED 1892

LOCK DRAWER 909 FAIRFAX 2-4020 COLUMBUS, GEORGIA

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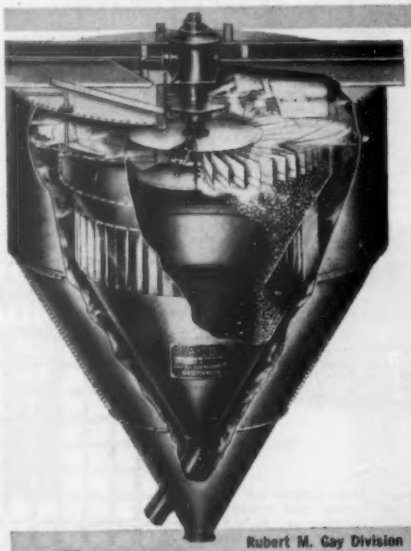
USING SCREEN SEPARATIONS? NOTHING CLASSIFIES AS PERFECTLY AS AIR



GAYCO

CENTRIFUGAL AIR SEPARATORS

Classify practically all dry fine materials

You get:

- CLOSER SEPARATIONS
- IMPROVED PRODUCTION
- NO UNDESIRABLE OVERSIZE

RANGE 60 to 400 mesh. Timken bearings. Choice of Standard or Heavy-Duty Models.

this helpful booklet sent on request

Robert M. Gay Division

UNIVERSAL ROAD MACHINERY CO.

117 Liberty St., New York 6, N. Y.

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In Canada: Watson-Jack Hopkins Ltd., Montreal

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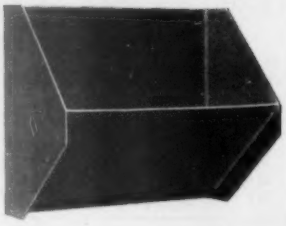
TOUGH
CONVEYING and ELEVATING CONDITIONS ?

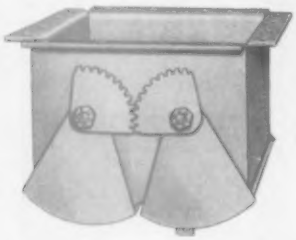
STANDARD METAL'S users lick TOUGH problems Every Day!

STANDARD METAL'S CONTINUOUS ELEVATOR BUCKET STYLE No. 2

This long-life bucket resists wear — delivers outstanding service and economy under severest conditions. This style is just one of the complete line of low-cost, rugged steel buckets manufactured by Standard Metal. Available in Salem, Style "A" and other continuous style buckets.



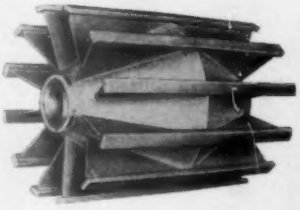
STANDARD METAL'S BIN GATES



Here's the all-steel, gear-operated Duplex Bin Gate for faster, easier material handling at minimum cost. Now supplied standard with twin bracket at bottom of gate, drilled to accommodate bolt for fulcrum lever.

STANDARD METAL'S WING-TYPE SELF-CLEANING PULLEY

Includes Taper-Lock Split Bushing to save time and trouble when mounting shaft. These pulleys are light in weight, yet their all-steel welded construction resists breaking, and delivers many years of trouble-free, low-cost service. Also available with solid hubs bored to specifications.



Contact us for full details and quotations on your particular needs in elevating and conveying equipment—for new installations or replacements. Ask for the catalog showing the complete Standard line.

STANDARD METAL MFG. CO.
110 CENTER ST. MALINTA, OHIO

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Winslow TRUCK SCALES
PIT AND PITLESS TYPES

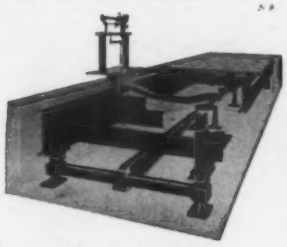
CABINET DIAL

Weight indication available includes ball bearing poise weighbeams, direct reading and weight imprinting types, and dial equipment with or without weight printer.

Write or phone for more information
PHONE NORTH 1231

TYPE CS—PORTABLE—PITLESS

Type CS scales, pitless installation, roller bearings, heavy duty, low maintenance. Capacities 15 tons thru 50 tons. Platform sizes 18′ x 9′ thru 50′ x 10′, wood or steel deck.



TYPE S—PIT SCALE

Type S scales, pit installations, roller bearings, heavy duty, low maintenance. Capacities 15 tons thru 60 tons. Platform sizes 22′ x 9′ thru 60′ x 10′ for wood or concrete decks.

WINSLOW GOVERNMENT STANDARD SCALE WORKS, INC.

4830 NORTH 25TH ST. **TERRE HAUTE, IND.**

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Your key

to more efficient business operation —

A subscription to

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DEPENDABLE
FOR 60 YEARS
Woven Wire
ALLOY
SCREENS
TWIN CITY IRON & WIRE CO.
St. Paul, Minnesota

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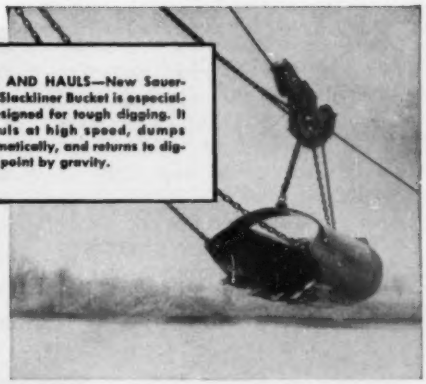
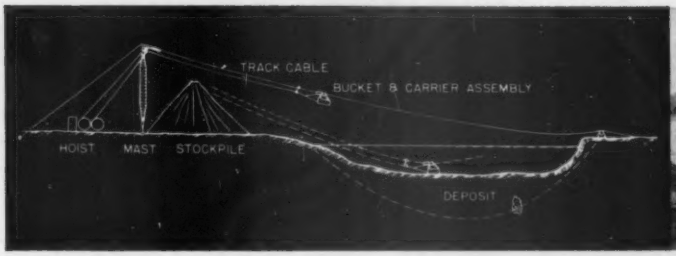
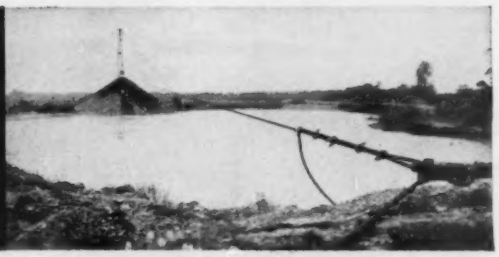
FROM PIT TO STOCKPILE...

Dig and Haul at Lowest Cost with a Sauerman Slackline



DIGS AND HAULS—New Sauerman Slackliner Bucket is especially designed for tough digging. It inhauls at high speed, dumps automatically, and returns to digging point by gravity.





STOCKPILES MATERIAL—Regardless of long hauls, the Slackline builds a large surge pile to allow charging the plant at any desired rate. Plenty of material is in ready reserve for seasonal or unexpected increases in schedule.

Operating costs as low as 8¢ per yd. for labor, power and maintenance are reported by Slackline Cableway owners when digging free-caving material at average depth and haul distances.

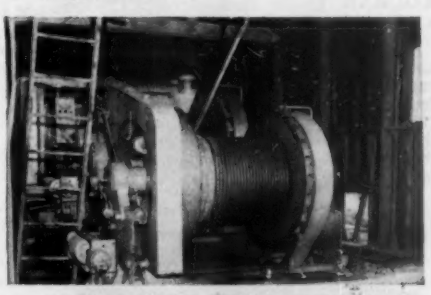
These low costs are achieved by using just one machine—the new Sauerman Slackline Cableway. Multiple equipment is not needed to supply your required tonnage. For example, on an average haul and digging depth, a single medium size machine will charge a 200 tph. plant.

The high Slackline mast permits building a large pile which can supply plant demands through a plate feeder and tunnel conveyor, front-end loader or clamshell. The new Sauerman torque converter diesel-hoist automatically matches power to load demands and is designed for continuous duty. Fluid drive cushions out shock loads to reduce fuel and maintenance costs, extend cable life.

Increasing land values and depleting resources make it necessary to get all the material out of your deposit. You can do this with a Sauerman Slackline. The machine will dig from ground level to deep under water and keep your plant running additional years at the lowest possible operating cost. Several pits are now operating Slacklines on 1000-ft. spans with average hauls of 500 to 700 ft. and from 100-ft. depths.

Write or call, giving your tonnage requirements, depth and length of deposit—if available. We will promptly supply more information on Slackline Cableways, and show you how to *save with a Sauerman.*

CONTROL IS REMOTE, EFFICIENT AND SAFE—Control station can be conveniently located at any strategic point in plant area. Operator can watch entire operation. Fatigue is minimized and personal danger eliminated.



TORQUE CONVERTER INCREASES PRODUCTION, CUTS MAINTENANCE—Now available, the new Sauerman Torque Converter Hoist automatically matches power to load, provides a smooth and steady flow of material, reduces fuel, maintenance and cable costs.

SAUERMAN BROS., INC. 634 SO. 28th AVE. BELLWOOD, ILL.
Linden 4-4892 • Cable CABEX—Bellwood, Illinois

Crescent Scrapers • Slackline and Towline Cableways • Duralite Blocks

who earned about $2,500 per year.

In *Joice v Missouri*, 189 S. W. (2d) 568, a 47-year-old man who earned about $2,000 a year obtained a verdict for $65,000 for ordinary injuries, an award which was ordered reduced by the court to $50,000.

Color No Bar

Last month a higher court held that a colored employee, as well as a white employee, can be discharged if his work is unsatisfactory.

For illustration in *Taylor v. Peter Kiewit and Sons Company*, 271 Fed. Rep. (2d) 639, the testimony showed these facts: A man named Taylor was sent by his union to the Peter Kiewit and Sons Company to do cement concrete and finishing work. The contractor had the legal right to discharge unsatisfactory employees.

One day the contractor discharged Taylor. The latter filed suit, alleging that he was wrongfully discharged from his job as a cement finisher because of his race and color.

During the trial the testimony showed that Taylor was not laid off because of his color but because of a reduction of force, coupled with the fact that other employees of the contractor could do the type of work then required better than he could. Therefore, the higher court held that Taylor could recover no damages from the contractor and said:

"Taylor says that his discharge was on account of his race and color and hence discriminatory in violation of the Fourteenth Amendent. As the record shows, and the trial found that there was no discrimination, it is unnecessary to consider the right of Taylor to maintain an action on any of the grounds asserted."

4'x12' KOLMAN Triple-Deck Screen Handles 120 Tons an Hour

Making specification aggregate in Southern Kansas calls for screening large volumes of fine material. When Mr. George Myers of Myers Materials, Inc. installed his new washing plant at Arkansas City, Kansas to produce concrete sand, engine sand and mason sand, his operation demanded a vibrating screen capable of handling fines effectively. His choice — a Model TC-120-48 KOLMAN Triple Deck Screen 12' long x 48" wide.

This high speed, vigorous action screen has proved itself fully capable of the rugged assignment. It receives material from the 8" pump at an average rate of 120-130 TPH. Everything under 2" hits the ¾" square opening screen cloth on the top deck, where less than 5% of the feed is removed. For certain specifications, a No. 4 screen is used on the middle deck.

But frequently the center screen is not used, and the full load of minus ¾" goes directly to the 6 mesh oblong opening bottom screen. Here 40% to 50% of the 120-130 TPH feed must pass, with a very minimum of carryover. Ralph Bridges, Plant Manager and John Bucher, Plant Superintendent, report that their KOLMAN Screen takes care of this separation beautifully. With slots running crosswise, the rapid, sharp stroke of the KOLMAN eliminates blinding on the 6 mesh screen in spite of the great amount of oversize on the deck and even in the most difficult areas of the pit.

KOLMAN Screens are designed for a wide variety of applications, including the toughest washing and crushing jobs as well as the light weight portable plant installations. Your KOLMAN dealer will be glad to provide you with complete data and the names of owners in your locality.

Type TC 4'x12'

WRITE FOR LITERATURE AND PRICES

KOLMAN MANUACTURING CO.

4800 W. 12th St. Sioux Falls, S. D.

Enter 278 on card, page 257

New Publication Issued On Work Rules for Profit

Work Rules for Profit, by Ola C. Cool, director of the Labor Relations Institute, covers such practical industrial problems as: featherbedding; wasteful work rules; changes in work rules, and group controls of productivity.

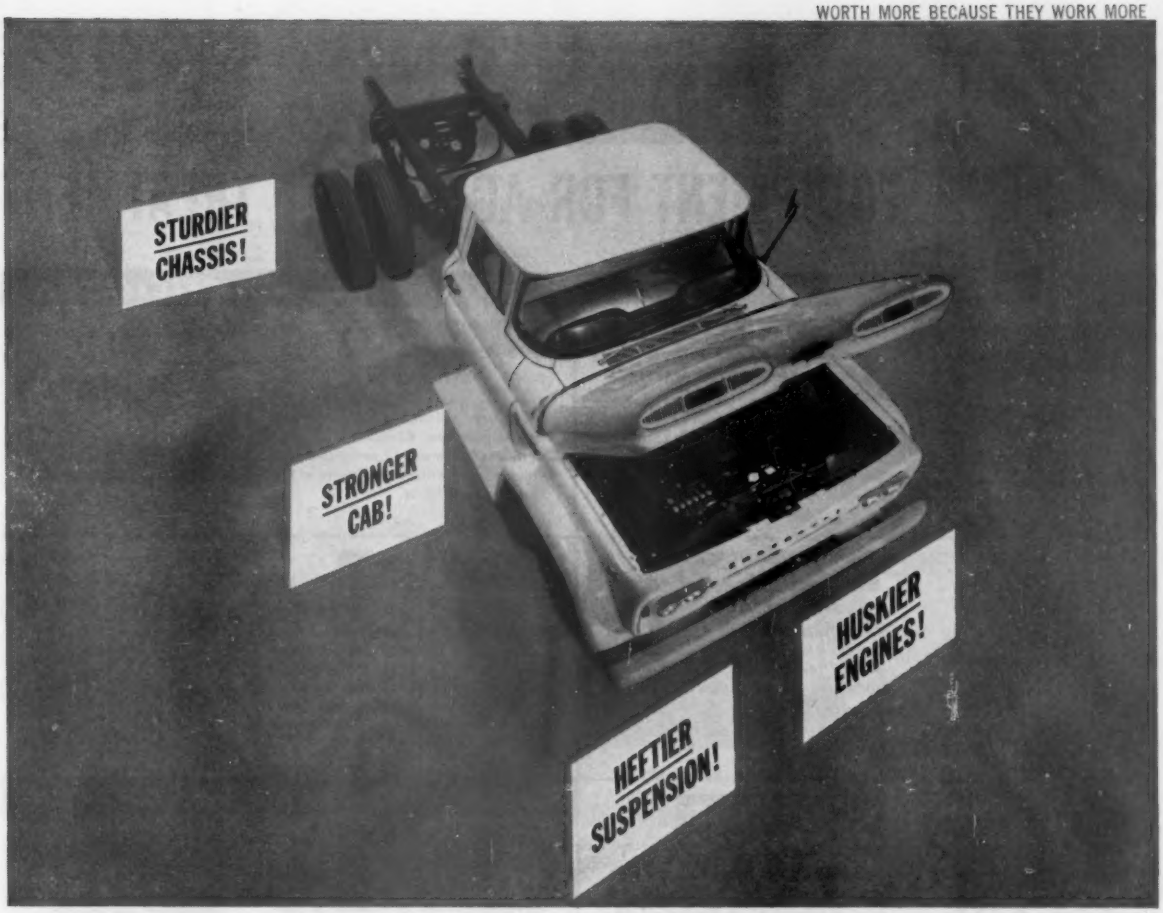
The book is documented with references to decisions of federal and state courts, together with rulings of arbitrators on these important issues.

Copies of the book may be obtained for $5 each, postage prepaid, directly from the Labor Relations Institute, P. O. Box 306, Millington, N. J.

Twenty-four-hours-a-day operation is contemplated at a new gravel pit opened near Guttenberg Heights, Minn., by William Hodgman & Sons, who are affiliated with Patcliff Gravel Inc. Initial output is at the rate of 350 t.p.h. of crushed gravel. Washed and graded crushed gravel will be used in highway construction in the area and in North Dakota.

The calcite quarry of Michigan Limestone Division (United States Steel Corporation) at Rogers City, Mich., has been designated officially as a Michigan historical site. It is reportedly the world's largest limestone quarry.

WORTH MORE BECAUSE THEY WORK MORE



CHEVY'S PUT TOGETHER TO STAY TOGETHER ...TO CLAMP DOWN ON COSTS!

Here are the strongest truck components known . . . assembled lastingly, with care and craftsmanship. It's Chevy's way of making sure you get maximum truck life; extra assurance of higher profits because of far fewer maintenance and repair charges.

NEW STRONGER CAB CONSTRUCTION. New steel braces reinforce cab underbody, help keep cab tight and solid. Husky new box-section pillars frame door openings, keep doors in lasting alignment. New roof panel is double walled for extra strength.

NEW STURDIER CHASSIS COMPONENTS. New stronger *frames* with rigid box-section rail design increase torsional stiffness up to 480%! And *brakes* are bigger for longer brake life and safer stopping. Bigger capacity *axles* and *suspensions* boost load-carrying ability.

TRUCK-BUILT V8's AND 6's. Components such as brawny forged steel crankshafts, long-lasting precision bearings and full-flow oil filters provide sure dependability that keeps your maintenance costs *down*.

NEW HEFTIER SUSPENSION smooths the ride; protects everything from wear and tear. Independently suspended front wheels, rigid control arms and strong torsion bar springs take tough runs with strength to spare.

■ Chevrolet's building 'em *tough* these days, even tougher than ever before. And that's saying something when you consider how Chevrolet trucks have stood up over the years. Here's a typical example:

600,000 miles—and still going strong! Here's ironclad evidence that Chevrolet trucks last. Since 1947, this Chevy middleweight has been averaging 1,000 miles a week, carrying big loads of sand and gravel for Lester Hall of Alexandria, Va. It has logged an amazing total of 600,000 miles and according to the owner, it's still a lot of truck!

That kind of performance has been Chevy's stock-in-trade for years; and the '60's are designed to put out even more of it. See your dealer for all the details. . . . Chevrolet Division of General Motors, Detroit 2, Mich.

1960 CHEVROLET STURDI-BILT TRUCKS

CHEVROLET

WEMCO

COMPLETE EQUIPMENT FOR AGGREGATE TREATMENT

SAND PREPARATION

WEMCO

SAND-PREPARATION MACHINE

Used wherever sand must be produced to specifications. Spiral with 75% pitch provides greater sand raking capacity . . . retention of fine sands with sharper separation . . . less maintenance.

WEMCO

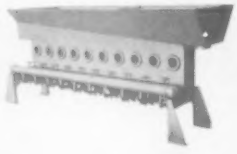
SAND-CLONE

Recovers and sizes sands in the finer fractions from dilute slurries. Supplements Wemco Sand Prep for special conditions or requirements.

WEMCO

SAND-SORT

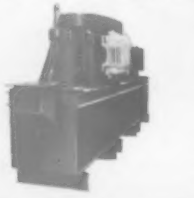
Free-settling classifying tank for separating sands into desired grades and sizes, removing large volumes of excess water, blending sand to varied specifications, with new automatic controls. Features individually controllable valve discharge . . . automatic valve closure in case of power failure or shutdown . . .



WEMCO

SAND-SIZER

Accurate sizing of sand into multiple fractions, and blending, for specification sand. Simple operation with maximum flexibility and control of each cell or compartment.



WEMCO

SAND-SCRUBBER

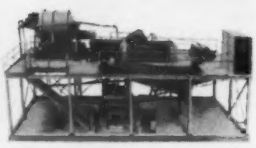
For economical scouring of sands, scrubbing off of coatings, breaking up of conglomerants. Opposed propeller blade action produces maximum scrubbing action with minimum contact time.

AGGREGATE BENEFICIATION

WEMCO

HMS MOBIL-MILL

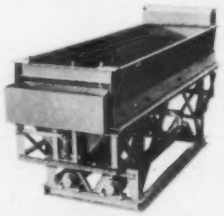
The only proved "packaged" HMS plant, pre-engineered, ready for set-up and operation. Removes wide range of deleterious material, produces large volume specification aggregate at low cost, minimum labor.



WEMCO

REMER JIG

For cleaning large tonnages of sand and gravel, production of specification aggregate . . . removes lightweight deleterious materials. Differential acceleration with long, wide bed gives faster, more active segregation over larger area.

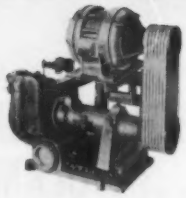


PUMPING—SAND and GRAVEL

WEMCO

SAND PUMP (HORIZONTAL)

Universally in use for transfer of slurries containing sands and abrasive solids, screen products and grinding mill discharge to washers, scrubbers, sizers, or sand preparation machines. Simple operation. Minimum wear and labor requirements.



WEMCO

SAND PUMP (VERTICAL)

Performance of horizontal Sand Pump with added vertical features. Widely used for clean-up duty installed over sump without need for separate pump pit.

WEMCO

TORQUE-FLOW PUMP

Unique Torque-Flow principle, open impeller, allows pumping of anything in a slurry which will enter throat. Handles solids with little wear at steady discharge pressures. Clogging by solids is eliminated.

WEMCO® *a division of*
Western Machinery Company
650 Fifth Street, San Francisco 7, California

other offices in:
New York Toronto
Hibbing Paris

Manufacturers' News

All stockholdings of Bay City Shovel, Incorporated, Bay City, Mich., have been purchased by Unit Crane & Shovel Corporation, Milwaukee, Wis.

Operation of the Bay City plant will continue under the direction of the following officers: President, S. S. SHERMAN; secretary-treasurer, DAVID EMERMAN; and vice-presidents, C. L. NELSON, A. R. CORBETT, A. B. PY, W. P. MATSCHKE, and E. F. RUETER. The company will function as a wholly owned subsidiary of Unit Crane.

A previous acquisition of Unit Crane was the manufacturing rights for Coles Cranes, obtained from Steels Engineering Products Company, Sunderland, England.

International Harvester Company is constructing a new motor truck parts depot on a 30-acre site directly south of the company's Fort Wayne, Ind., motor truck engineering department and laboratories. The new operation will supply motor truck parts to the company's existing 12 parts depots located throughout the United States. The installation will have a total area of 625,000 sq. ft. Completion and occupancy are scheduled for November 1, 1960.

Joy Manufacturing Company has made several appointments. HERBERT G. TORPEY has been named

H. G. Torpey

Arnott Lee

district sales manager for the Mining and Construction Division, San Francisco office. He replaces L. C. (DUSTY) RHODES, who has been granted an extended leave of absence.

ARNOTT J. LEE has been appointed manager of portable compressor products. Mr. Lee will be responsible for product planning and merchandising of portable compressors. MAYO C. KELLEY fills the post vacated by Mr. Lee—district

Mayo Kelley

R. E. Kinter

sales manager for the Mining and Construction Division, Chicago-St. Louis territory.

Following the retirement of ROY E. CAMPBELL, after 31 years with Joy, ROBERT E. KINTER was appointed director of advertising and sales promotion to the company's Mining and Construction, Coal Machinery, and Industrial Divisions. He will provide staff advice to several other divisions.

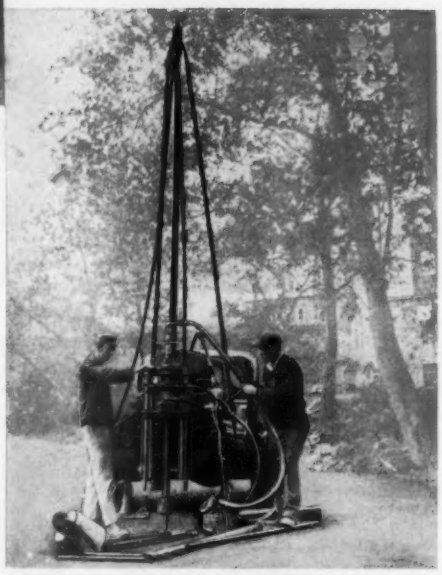
Victor Equipment Company, San Francisco, Calif., has acquired L&B Welding, Incorporated, Berkeley, Calif., manufacturer of machines for the rebuilding of tractor track rollers, idlers, and rails. The new acquisition will be operated as a wholly owned subsidiary, with manufacture continuing at the present plant in Berkeley. L&B executives TURNER G. BRASHEAR, FOREST LEADER, and CLIFFORD LEADER will remain in management capacities.

Present plans call for marketing the L&B product line under the Victor name through Victor dealers throughout the United States, Canada, and the export field.

C C & E Co.
The smartest distance between two points
Your nearby authorized Continental Conveyor Distributor can furnish the right equipment for your materials handling job — from stock, or from a nearby Continental Conveyor warehouse. Genuine Continental Conveyor components are backed by more than 127 years' experience in designing and manufacturing quality equipment for American industry.
Ask your distributor for the big Continental Conveyor Belt Conveyor Data Book — 88 pages of easy-to-use information.
Call on your CONTINENTAL CONVEYOR MAN for help on materials handling problems.
Continental
CONVEYOR & EQUIPMENT CO.
Birmingham, Alabama
Sales Offices in: ATLANTA DALLAS HUNTINGTON MEMPHIS NEW YORK
Formerly Industrial Division, Continental Gin Co.
Enter 281 on card, page 257

IS THERE A VOID IN YOUR DRILLING PROGRAM

?



FILL IN THIS VOID

WITH STURDY . . . DEPENDABLE . . .
SPRAGUE & HENWOOD EQUIPMENT

Many progressive and successful firms throughout the United States and in foreign countries want and use no other core drilling equipment except Sprague & Henwood's. They have found it to be rugged . . . easy to use . . . versatile. Are you having trouble? You might just have the wrong equipment. Why not write to Sprague & Henwood today and describe your present drilling conditions, or the drilling conditions you expect to encounter. Sprague & Henwood will supply you with equipment and complete drilling information, enabling you to go far toward filling the void in your drilling program.

Look for our emblem... It's your Seal of Quality

SPRAGUE & HENWOOD, Inc.
SCRANTON 2, PA.

MEMBER OF: DIAMOND CORE DRILL MANUFACTURERS ASSOC.

New York • Philadelphia • Atlanta • Pittsburgh • Grand Junction, Colo. • Buchans, Nfld.
Export Division: Sprague & Henwood International Corporation, 11 W. 42nd St., New York, N.Y.

Enter 282 on card, page 257

RICHARD K. TESKE was named Chicago district manager, Leschen Wire Rope Division, H. K. Porter Company, Incorporated. He was formerly Michigan territory salesman for Leschen. His district includes all of Indiana, Michigan, Wisconsin, Minnesota, North Dakota, and parts of Illinois, Iowa, Ohio, and Kentucky.

R. K. Teske

H. S. Bain

HARRY S. BAIN has been appointed district representative for the Le Roi Division, Westinghouse Air Brake Company, Milwaukee, Wis. He will work throughout New England with dealers who handle the Le Roi air tool and air compressor lines. He has previously worked with a Canadian air tool manufacturer, and was a sales engineer for the Anglo-Iranian Oil Company, Ltd.

KENNETH A. DELONGE has been appointed manager of direct sales in the Primary Nickel Department of The International Nickel Company, Incorporated, New York, N. Y. Mr. DeLonge joined International Nickel in 1937.

Three business aircraft, a twin-engine 6-passenger E-18 Super Beech, a twin-engine 5-passenger Aero Commander, and a 4-place Beech Bonanza, have been acquired by Pangborn Corporation, Hagerstown, Md., to provide more rapid and convenient customer service.

RANDOLPH L. RUHLEY has joined the Martin Engineering Company Neponset, Ill., as field manager of sales and development. Mr. Ruhley, formerly vice-president and general sales manager of the Branford Company, New Britain, Conn., has sold his interest in that company.

WILLIAMS ROLLER MILLS

- **Quality Fine Grinding... 20 Mesh To 400 Mesh... Micron Sizes On Some Materials**

EXCLUSIVE GEARLESS AND SPUR GEAR DRIVES

Another Williams advancement! Cutaway shows Type D Mill with Spinner Air Separator with spur gear and pinion drive used on Standard and larger models. Smaller sizes have simple gearless V-belt drive which is easier to maintain than bevel gear drive—cuts labor and downtime.

Bearing alignment of central shaft is simplified with only 2 bearings, the bottom one carrying thrust as well as radical load.

NOTE FLOW OF MATERIAL being ground by rolls rotating against bull ring, then air-swept to separator which discharges finished product while returning coarse tailings for regrinding.

From raw material to finished product—completely automatic grinding, blending and precision classifying to 20 mesh or micron size!

Self-adjusting feed rate . . . instant adjustment for sizing, even while mill is in motion . . . continuous automatic take-up to compensate for wear . . . constant rising air current to prevent build-up of fines and inefficient operation . . . automatically controlled hot-air drying during grinding of moisture-carrying materials . . . all are features of Williams Roller Mills that virtually guarantee increased output, surprising cost reductions and exceptionally high uniform quality. Get all the facts immediately . . . *Write today for catalog.*

WILLIAMS PATENT CRUSHER & PULVERIZER CO.

802 ST. LOUIS AVE. St. Louis 6, Mo.

WILLIAMS

CRUSHERS GRINDERS SHREDDERS

Oldest and Largest Manufacturers of Hammer Mills in the World

product:

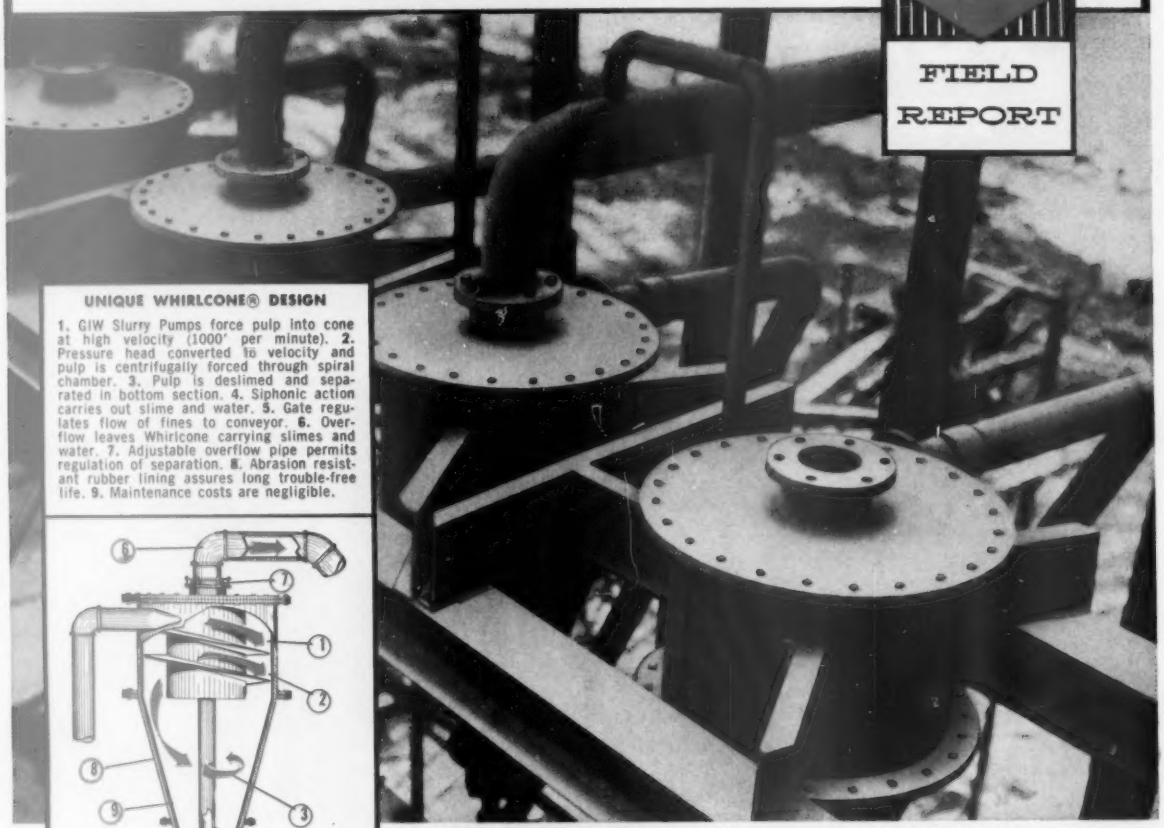
COTTRELL WHIRLCONE® SEPARATORS

customer:

BECKER COUNTY SAND & GRAVEL CO.

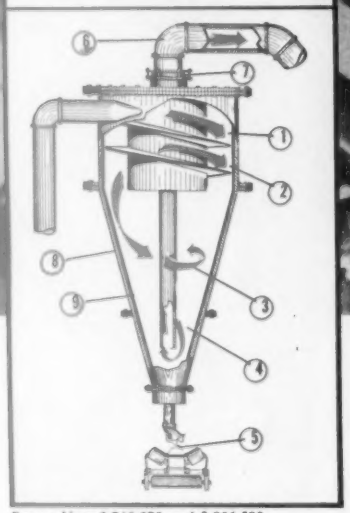
GIW

FIELD REPORT



UNIQUE WHIRLCONE® DESIGN

1. GIW Slurry Pumps force pulp into cone at high velocity (1000′ per minute). 2. Pressure head converted to velocity and pulp is centrifugally forced through spiral chamber. 3. Pulp is deslimed and separated in bottom section. 4. Siphonic action carries out slime and water. 5. Gate regulates flow of fines to conveyor. 6. Overflow leaves Whirlcone carrying slimes and water. 7. Adjustable overflow pipe permits regulation of separation. 8. Abrasion resistant rubber lining assures long trouble-free life. 9. Maintenance costs are negligible.



Patent Nos. 2,738,070 and 2,806,599

Tough GIW Slurry Pumps feed pulp to these 25″ dia. Whirlcones®, which retain fines from classifier overflow. Maximum recovery rate is 20 tons per hour per cyclone. The cones will handle material from −12 mesh to lightest slime.

Whirlcone® Separators solve difficult fine recovery problems.

The retention of fines in the −50 plus 200 mesh range posed a disturbing problem for the Becker County Sand & Gravel Co., of Cheraw, S.C., primarily because the large amount of water used in processing the sand and gravel washed out the desirable fines with the minus 200 slimes.

Fourteen 25″ dia. Whirlcone® wet type cyclones installed parallel in four Becker plants solved this problem completely. Operating an average of 8 hours daily, they extract up to 100 tons of clean, fine sand per hour from wash water while the minus 200 mesh slime is discarded.

Recovered fines are used to bring sand up to specifications. Thousands of tons of valuable sand, formerly lost, soon paid for the low cost of the Whirlcones®.

GIW's highly efficient Whirlcones® are also being used in the mining fields to deslime, degrit, classify, concentrate, make dam and mine backfill and to dewater or thicken where the overflow can be returned to the process or it can be discarded.

They are available in diameters from 6″ to 50″. Capital cost including the pump is 20 to 50% of conventional classifiers.

If you are losing fines from material −12 mesh to lightest slimes, write today. Recommendations and literature will be forwarded promptly.

COTTRELL ENGINEERING
Division of
GEORGIA IRON WORKS CO.

GIW

Manufacturers of pumps, dredges, separators and accessories.

AUGUSTA • GEORGIA

The acquisition of Industrial Brownhoist Corporation, Bay City, Mich., was announced by JOHN E. CARROLL, president, American Hoist & Derrick Company, St. Paul, Minn. The transaction was effected by purchase of the outstanding stock of Industrial Brownhoist for an undisclosed amount. Mr. Carroll stated that the range of products manufactured by the Michigan firm complement those built by American Hoist.

Industrial Brownhoist will be operated as a wholly owned subsidiary of the purchaser, effective immediately, and operations will continue at Bay City.

C. S. Hale

Three men at The White Motor Company, Cleveland, Ohio, have been elected regional vice-presidents. All had previously been regional managers.

CHARLES S. HALE was elected regional vice-president of the North Atlantic region, and EDWARD S. HOKE, regional vice-president of the Eastern Region. ROBERT F. SHARPE was elected regional vice-president of the Southern Region.

E. S. Hoke

R. F. Sharpe

The appointment of WALLACE E. FELLDIN as sales manager of the New York plant of Joseph T. Ryerson & Son, Incorporated, steel and aluminum distributors, has been announced. He succeeds HENRY B. WILLIAMS, who was named special assistant and sales consultant to the general manager.

FRANK J. KELLY has been named a field representative for the Tampa, Fla., branch office of the Master Builders Company.

N. V. CHEHAK and M. P. LUBER have been appointed members of the board of directors of Link-Belt Speeder Corporation, Cedar Rapids, Iowa. At the same time, chief engineer F. J. STRNAD was named vice-president and chief engineer.

WILLIAM H. BECHMAN has been appointed to the position of chief engineer for Athey Products Corporation, Chicago, Ill.

Mr. Bechman will be responsible for all engineering for the company's present lines of pneumatic-tired, off-highway trailers, Force-Feed loaders and Forged-Trak equipment. He will also be in charge of Athey's accelerated development program for new equipment for the heavy construction, mining, railroad, and industrial markets.

240 TONS PER HOUR!
243,000 TONS IN 9 MONTHS!
6 "SET-UPS" 5 State jobs and 1 City job required 6 different plant "set-ups." Distances between "set-ups" varied from 8 miles to 540 miles.

...reports Mark C. Whiting, President of Whiting Bros. Const. Co., Inc., Las Vegas, Nevada

DISMANTLED, MOVED AND SET-UP IN ONE DAY
Plant was dismantled on Saturday ...moved 8 miles and was in full production again Monday morning. (Only work done on Sunday was connecting asphalt lines and changing screens.)

the Contractor... WHITING BROS. CONST. CO., INC.
the Asphalt Plant... MADSEN
MODEL 481 5000-LB. PLANT

Figures like these tell a story. They indicate the tremendous output of the MADSEN Model 481 5000-lb. Asphalt Plant over a period of months on various Federal and State Specification mixes... the kind of day-in and day-out tonnage that builds owner profits.

They tell of the easy, low-cost maintenance and economical operation of the MADSEN Model 481. (Downtime in the 9 months period was only 12 hours.)

They show how the unit construction of the MADSEN Model 481 pays off in ease of portability and fast, easy set up and dismantling.

And most important, they show that the MADSEN Model 481 Asphalt Plant gives you the advantages you need to make greater profits in today's fast-moving asphalt mixing business. Check with your MADSEN Distributor.

1910 - 1960 50 YEARS — SERVING INDUSTRY

Complete parts stock in Los Angeles and Lima, Ohio

MADSEN WORKS / Construction Equipment Division BALDWIN-LIMA-HAMILTON CORPORATION

14120 E. ROSECRANS AVE., P. O. BOX 38, LA MIRADA, CALIFORNIA
BALDWIN-LIMA-HAMILTON CORPORATION, LIMA, OHIO

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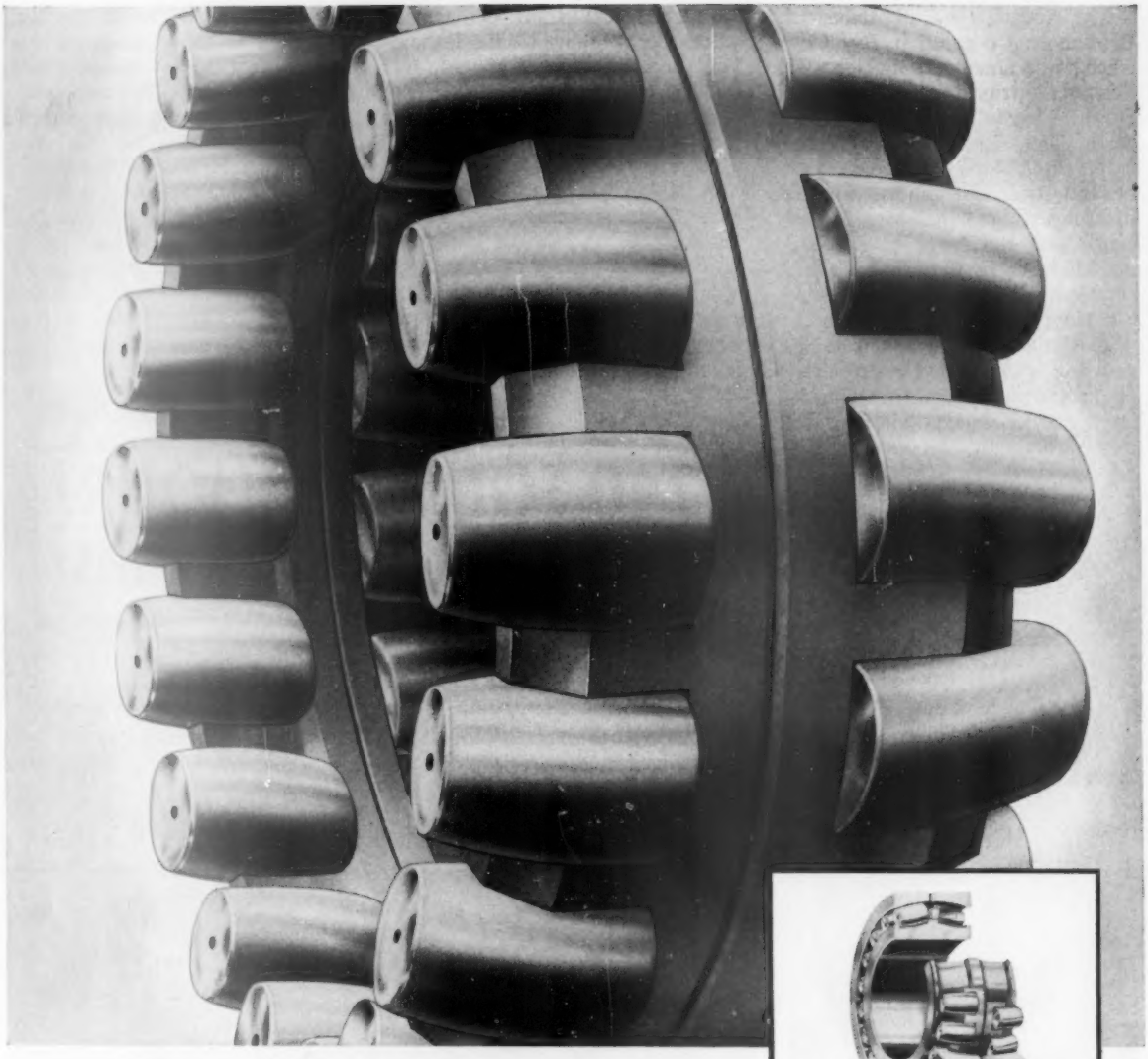
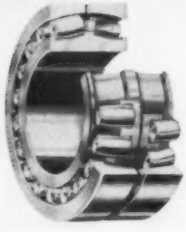




Superior design features of TORRINGTON SPHERICAL ROLLER BEARINGS

- integral guide flange for roller stability
- asymmetrical rollers seek flange for positive guidance
- electronically matched rollers
- size-stabilized races
- fully machined land-riding bronze cages
- controlled internal clearances
- even load distribution
- inherent self-alignment
- long service life

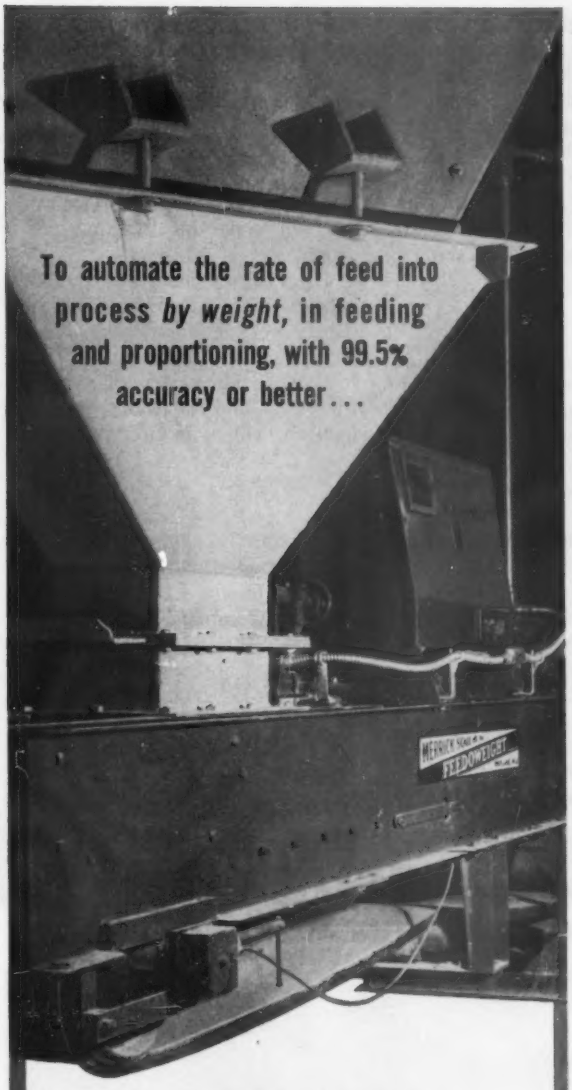
"Caged" for Longer Life!

The two land-riding cages in Torrington Spherical Roller Bearings assure proper roller spacing and guidance, even under rugged conditions of shock load and sustained high speeds. These fully machined cast bronze cages operate independently. Their design eliminates drag on rollers. These high-strength cages help bearings give longer life by providing low friction, smooth running and cool operation. Highly effective and generous lubrication of all contact surfaces is achieved with the open-end cage design.

The result: Torrington Spherical Roller Bearings are built to give extra years of unmatched service life in heavy-duty applications. Torrington's long experience in design, engineering and manufacture of every basic type of anti-friction bearing provides the finest spherical roller bearings available. You'll find it pays to standardize on Torrington.

progress through precision **TORRINGTON BEARINGS**

THE TORRINGTON COMPANY South Bend 21, Indiana • Torrington, Conn.


To automate the rate of feed into process *by weight*, in feeding and proportioning, with 99.5% accuracy or better...
MERRICK SCALE CO.
FEEDOWEIGHT

The Merrick® FEEDOWEIGHT

Automates complete plant processes involving the accurate blending of materials and additives . . . records running total weight as it feeds . . . is available in models for all rates of feed up to many hundred tons per hour . . .

For bulletin and detailed information on the Merrick Feedoweight, write . .

Merrick

more than fifty years of "firsts" in automatic weighing

MERRICK SCALE MANUFACTURING COMPANY
180 Autumn Street • Passaic, N. J.

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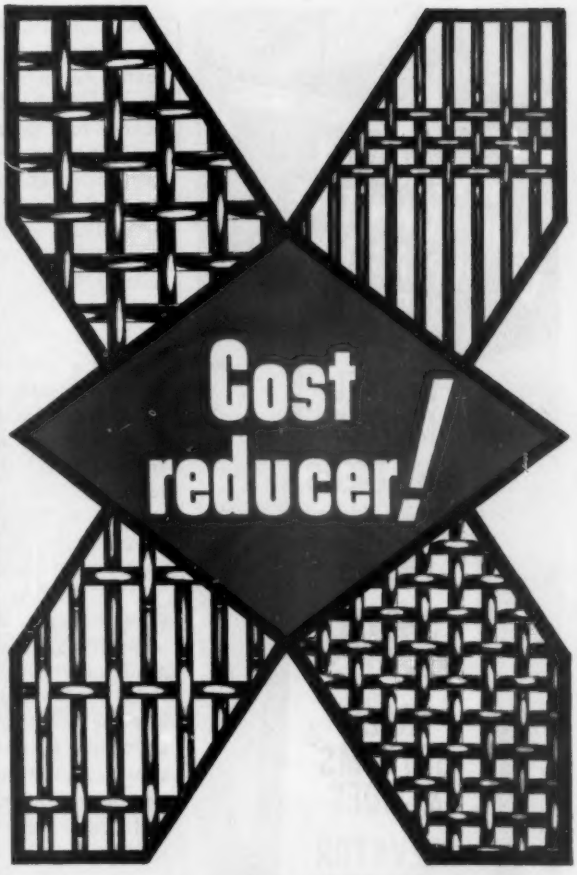

STARSTEEL HEAVY DUTY SPACE SCREENS

You save money several ways with STARSTEEL Screens:

✓ Tougher, more ductile, specially-alloyed wire —more rigid weaving—plus precision-applied hook strips for tighter tensioning, have amazing resistance to abrasion, fatigue, breakage and distortion.

✓ Rigid, tighter weaving that maintains accurate openings, reduces plant-clogging recirculating loads, increases feed across the screen, insures consistent product uniformity and higher quality.

✓ STARSTEEL Screens drastically cut the cost of replacements, downtime and maintenance—keep production high, insure bigger profits. Order, insist on STARSTEEL. *Write for catalog.*

QUICK SHIPMENT of all popular weaves, meshes, gauges

Star will produce screens or cloth from stainless or other steel alloys, Monel, brass, bronze, copper, aluminum and most other metals that can be drawn into wire. Inquiries invited.

STAR WIRE SCREEN & IRON WORKS, INC.
2515 San Fernando Road • Los Angeles 65, Calif.

Subsidiary of Ludlow-Saylor Wire Cloth Company, St. Louis, Mo.

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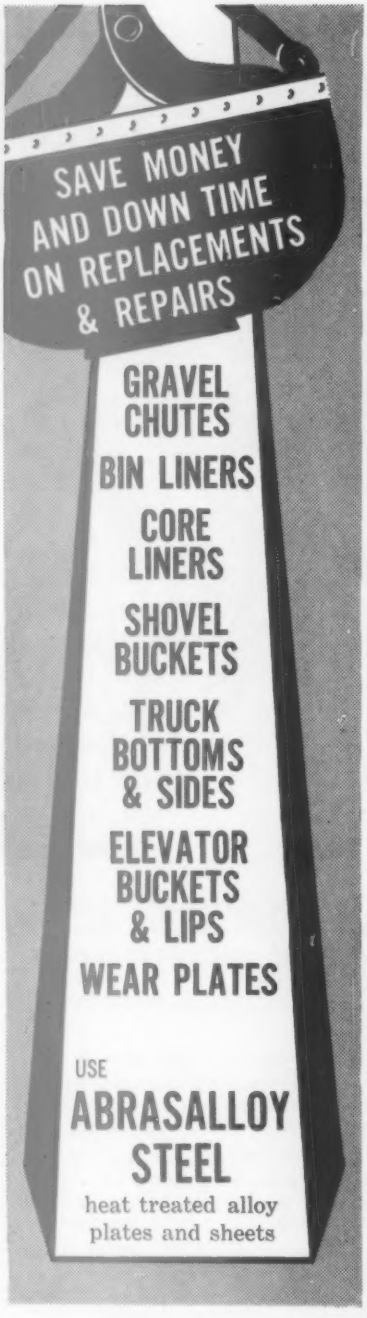


ABRASALLOY STEEL withstands tremendous impact and abusive abrasion from rock, sand, grit, gravel, other destructive elements. It is easily formed, sheared, bent... has amazing hardening qualities. Available in all thicknesses, widths, lengths. Cut to size and shape.

FREE Folder P-7. Write today!

ATLANTIC STEEL CORP.

General Motors Bldg., New York 19, N. Y.
Warehouses: 35-27 36 St., Astoria 6, New York, N.Y
4342 E. Washington Blvd., Los Angeles 23, Cal.
Over 40 Years of Service to Industry

Enter 288-A on card, page 257

Scandinavia Belting Company, Charlotte, N. C., manufacturers of textile beltings, automotive and industrial brake linings for over 40 years, has changed its name to Scandura, Incorporated. The decision to change the name was based upon the wide acceptance of the Scandura trademark by industry in general, and a desire for a shorter name.

A new multiwall bag manufacturing plant of 300,000 sq. ft. for Kraft Bag Manufacturing Corporation, Gilman Paper Company subsidiary, New York and Chicago, has been completed, and is in full operation at St. Marys, Ga.

A number of sales staff appointments have also been made.

P. F. FINLEY, formerly assistant sales manager, has been promoted to southeastern sales manager, with headquarters in Raleigh, N. C.

F. C. FOOS JR., who has been working out of St. Louis to cover southern Illinois, Missouri, Arkansas, and eastern Oklahoma, has also been assigned western Kentucky and Tennessee.

P. E. BRAY, who previously covered the entire state of Georgia, will now cover southern Georgia and Florida, and will work out of Jacksonville.

A. E. ROOD JR. has been appointed to cover northern Georgia, Alabama, and eastern Tennessee. He will make his headquarters in Atlanta.

R. A. PORT has been named to cover Mississippi, Louisiana, and Texas, working out of New Orleans.

R. E. BURKE has been appointed to cover the states of Virginia, Maryland, and Delaware. His headquarters will be in Baltimore.

RICHARD U. (DICK) LARSON has been named wire rope sales representative for the LeTourneau-Westinghouse Company, Peoria, Ill. He replaces ROBERT PAUSTIAN, who has been transferred to the L-W western sales office in Salt Lake City, Utah. Mr. Larson's territory will include Ohio, Indiana, Michigan, Wisconsin, Illinois, Minnesota, Iowa, North and South Dakota, Kansas, Nebraska, and Missouri.

Wherever Ore Moves, SCOOT-CRETE
Ore Carriers Move It • FASTER • EASIER • AT LOWER COST

SCOOT-CRETE CD-4, shown being loaded in mine, will carry up to 15 tons payload. Model CD-3N has 5-ton payload. Note driver's side-mounted position for maximum vision and efficiency, forward and rear.

***Throughout the world,* SCOOT-CRETE gives top-rate performance. No rails needed, no ties, no cars, no independent power source. Diesel-powered for operation inside the mine, SCOOT-CRETE carriers are rugged for around-the-clock service; carry up to 15 tons at speeds to 15 mph, climb grades up to 18%. Available with standard or fully automatic transmission. SCOOT-CRETE has equal speeds forward and reverse for fast shuttle service. All CD models approved by U. S. Bureau of Mines for underground mining.**

Units available from 3,000 lb. to 15-ton capacity. Write for specifications and literature. See your Dealer.

GETMAN BROTHERS SOUTH HAVEN, ZONE 6, MICHIGAN

Enter 288-B on card, page 257

(O)—a famous symbol of dependable quality in many packaging fields . . . glass and plastic containers, corrugated boxes, and multiwall bags.

PR Paul Revere—renowned patriot and skilled silversmith. His hallmark meant careful workmanship and creative ability . . . stands for the finest quality today.

Think of the maker when you buy any product . . .

It pays to buy bags from a packaging specialist!

So MUCH MORE than just the ability to produce it must be considered when you buy any manufacturer's product. It must be backed by experience, to assure you that the product is properly designed to fit its specific uses . . . by dependability to assure you of exactly what you want, when and where you want it . . . and, of course, by quality.

Owens-Illinois, through its leadership in many fields of packaging, can help you in all your multiwall bag requirements—the *right* multiwall bag for every packing, handling, storage, and shipping method.

For full information,
write to Owens-Illinois,
Multiwall Bag Division,
Toledo 1, Ohio

MULTIWALL BAGS
AN (O) PRODUCT

OWENS-ILLINOIS
GENERAL OFFICES · TOLEDO 1, OHIO

TISCO®

LONG WEARING TIMANG®

MANGANESE — NICKEL STEEL WELDING PRODUCTS

◀ **WELDING RODS** — TIMANG-NICKEL MANGANESE for build-up, joining and repair of manganese steel. Has same manganese content, work harden-ability and wear resistance as cast manganese.

TIMALLOY composite type rod for joining manganese and carbon steel. Also an excellent rod for build-up and repair of manganese castings.

◀ **HOT ROLLED PLATES** — TIMANG-NICKEL MANGANESE for chute liners, dump truck beds, rock and ore hauling trailer bottoms, dragline buckets, rebuilding power dippers, and fabricating new parts. Plates supplied as rolled (not annealed).

◀ **SPECIAL SHAPES** — HOT ROLLED TRACTOR GROUSER BARS for repair of tractor treads. Timang bars in mill lengths up to 20 feet. High carbon bars in lengths of 10 feet — cut to size required.

◀ **WEDGE BARS** — For shovel tooth build-up. The hot-rolled manganese-nickel steel bars can be supplied in mill lengths up to 20 feet, but normally are furnished in 36 inch lengths.

◀ **TOOTH REPOINTERS** — Weld on cast manganese or alloy steel repointers for rebuilding worn dipper teeth — various shapes and sizes available on request.

◀ **APPLICATOR BARS** — Hot rolled rounds, squares, and flats available in mill lengths up to 20 feet or cut to required length.

For more information write to:

TAYLOR-WHARTON CO.

DIVISION OF HARSCO CORPORATION

Established 1742

HIGH BRIDGE 3, NEW JERSEY

PLANTS: Cincinnati, O. — Birmingham, Ala. — Easton, Pa.

SALES OFFICES: New York — Chicago — San Francisco

The appointment of E. A. SMITH as director of foreign operations for Koehring Company, Milwaukee, Wis., and the election of VINCENT PETERSON as secretary of the company has been announced.

Mr. Smith, who has been with the company since 1953, will be in charge of all of Koehring's overeas manufacturing and licensing activities. He replaces F. H. HEINE, who retired recently.

Mr. Peterson, elected secretary, replaces P. P. GRASER, who retired in February after more than 30 years with the company. The board of directors voted to discontinue the office of company treasurer.

S. P. Terlecky

S. P. TERLECKY has been promoted to the position of manager of wire braid hose sales, Republic Rubber Division, Lee Rubber & Tire Corporation, Youngstown, Ohio. Mr. Terlecky joined Republic in 1951. He succeeds J. A. MACINTIRE, who has been appointed general sales manager.

J. D. Robertson, Incorporated, Atlanta, Ga., have been named southeastern representatives by Sturtevant Mill Company, Boston, Mass. The group will represent Sturtevant in eight southeastern states—North Carolina, South Carolina, Georgia, Florida, Alabama, Mississippi, Tennessee and Virginia.

JAMES G. GELDER has been appointed general manager of Diamond Electronics, division of Diamond Power Specialty Corporation, Lancaster, Ohio. The division is a pioneer manufacturer of closed circuit television systems. Before Mr. Gelder joined Diamond Electronics in July, 1958, as marketing manager, he had been a sales manager for Process Controls Systems at the Philco Corporation.

PREVENT SCALE FAILURE WITH HOWE SCALE SERVICE

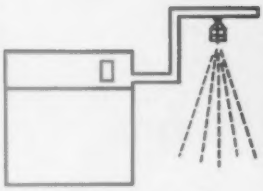
Howe Scale Service keeps your scales at peak accuracy . . . cuts down on time lost from scale failure . . . eliminates excess material costs caused by inaccurate scales.

A Howe Scale Service Agreement means trained Howe scale mechanics regularly test, clean, lubricate, and calibrate your scales . . . inspect critical areas for wear and damage . . . make repairs when necessary. Using the most modern test equipment, they service indicators, printers, scale accessories . . . advise you on tolerances and adjustments. In short, they handle your entire scale maintenance program for any makes, sizes, and types of scales. Find out how convenient and economical it is to have your scales serviced regularly by Howe. Your local Howe representative will gladly explain the details of Howe Service Agreements and outline a scale maintenance program for you. Call him, or write to the Howe Scale Company, Rutland, Vermont. Howe Scale Service is available everywhere. *Write today for a* free *detailed illustrated folder, "Scale Service".*

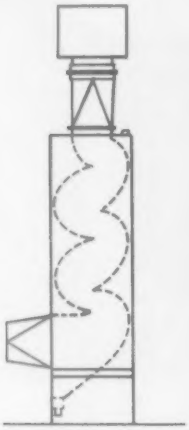
HOWE

THE HOWE SCALE CO., RUTLAND, VT.
A SUBSIDIARY OF AMERICAN MANUFACTURING COMPANY, INC.
HOWE SCALES OF CANADA, MONTREAL, QUE.

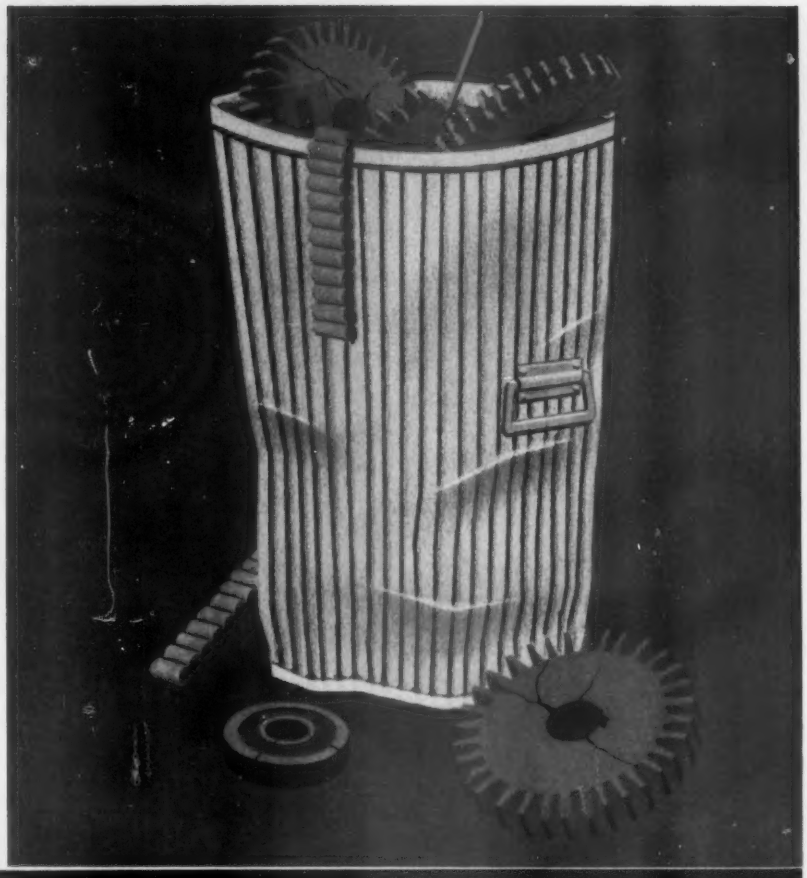
Enter 291 on card, page 257



J-M Chem-Jet—
Engineered systems that control dust at its source



J-M Hydro-Volute Scrubbers—guaranteed 99% efficient in removing dust, fumes, odors



engineered dust control adds years to equipment life

J-M Verticone—for dust-free unloading and materials handling

new low prices on J-M equipment

Damage to machinery and equipment from excessive dust is a very real and expensive problem. Motors, bearings, electrical equipment and similar expensive capital equipment would operate years longer without the wear and abrasion of invisible dust particles.

Johnson-March Dust Control Engineers have the experience and the equipment to solve your dust problem effectively—and at low cost . . . Johnson-March by specializing in dust control engineering has become the leader in the field.

Ask your consulting engineer or write Johnson-March Corporation, 3018 Market Street, Philadelphia 4, Pa.

JOHNSON MARCH

dust control engineers

PETER F. KOCH has been named manager of a newly created Jackson, Miss., district office to handle P&H construction and mining equipment manufactured by Harnischfeger Corporation, Milwaukee, Wis. The new district is made up of Mississippi, Louisiana, Arkansas, and western Tennessee. This region formerly was part of the Birmingham district, but is being set up as a separate territory in order to achieve a more thoroughly developed market.

ROBERT W. THORNBURG has been named manager of the engineering department of Blaw-Knox Company's Construction Equipment Division. He will be in charge of both design and production engineering at Mattoon, Ill., headquarters for Blaw-Knox construction equipment production.

R. W. Thornburg

J. R. Mills

JOHN R. MILLS has been named sales manager for the Rotadrill Division, Schramm, Incorporated. In 1952 he was retained by a United Nations technical assistance group to develop the original well drilling program for Afghanistan. He has recently returned from Australia, where he directed a survey on ground water development for the Edward E. Johnson Company.

Appointment of the H. C. Ormes Construction Company of Minneapolis, Minn., as sales and service dealer for the Eimco line of crawler-tractors has been announced by The Eimco Corporation, Salt Lake City, Utah. The Ormes organization will represent Eimco in the southern portion of the state, as far north as Pine, Kanabec, Mille Lacs, Morrison, Todd, Otterhead, and Clay counties of Minnesota.

Austin plastic connectors provide a quick fuse hook-up. Simply thread fuse from shot hole through length of connector and press trunk line into grooved slots. Then return branch line through end of connector on other side of trunk line and pull tight.

AUSTIN
Detonating Fuse

promotes blasting efficiency

Filled with a high explosive core, Austin Detonating Fuse possesses sufficient strength and speed to initiate an entire column of explosives . . . connects all holes with an effective detonating agent.

Austin Detonating Fuse is easy to handle, too. It's light in weight and flexible with a tough, waterproof coating that won't crack, chip or peel when being laid.

3 types—There's a type of Austin Detonating Fuse for virtually any purpose. Type 60 is standard. Type 100 is more powerful and for less sensitive explosives and blasting agents. Type 175 is for use with uncoated ammonium nitrates.

All 3 types are insensitive to shock, abrasion and strong electrical currents. They can be detonated only with fuse and cap or electric blasting cap.

AA-9674

USED IN 1833 AUSTIN EVER SINCE

AUSTIN
POWDER COMPANY
CLEVELAND 13, OHIO

explosives ◆ ammonium nitrates ◆ primers ◆ detonating fuse
permissibles ◆ blasting supplies ◆ AP drill heads and bits ◆ mine tools

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HAYWARD CLAMSHELL BUCKETS

**WORK LONGER,
WORK FASTER,
WEAR LESS!**

Designed with rugged, one-piece alloy shells ... wide type, cast manganese steel cutting edges... smooth shell interior for fast, capacity loads and easy discharge ... manganese bushings... diagonal truss brace to keep shell in line... has no side sway or back lash... *plus many other cost-cutting design features!*

Get complete details. Write today for illustrated bulletin.

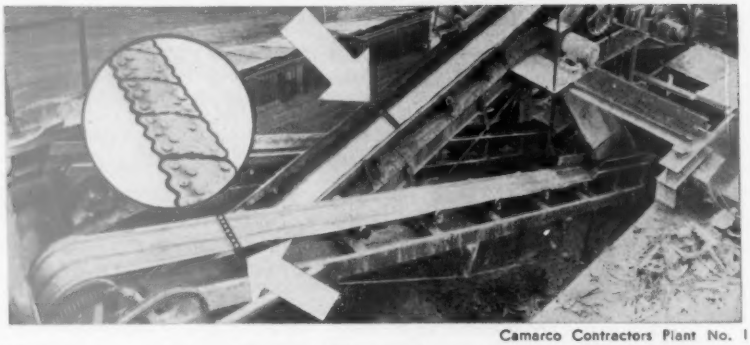
THE HAYWARD COMPANY

50 CHURCH STREET, DEP'T P, NEW YORK 7, N. Y.

Builders of Better Buckets Since 1888

Enter 294-A on card, page 257

"We tried them all— then standardized on CRESCENTS"



Camarco Contractors Plant No. 1

"Our conveyor belts take a terrific beating and only a rugged fastener will hold them. We found that CRESCENT plates did a superior job, and because of the speed with which they can be attached with CRESCENT self-clinching rivets, *WE CUT OUR DOWN TIME IN HALF!*"

NO HOLES TO BORE • **A HAMMER IS ALL YOU NEED!** • NO TOOLS NECESSARY

CRESCENT BELT FASTENER CO.

381 Fourth Ave., New York, N. Y.

TORONTO, CANADA — BIRMINGHAM, ENGLAND

Distributors throughout the World

Enter 294-B on card, page 257

V. L. SNOW has been appointed general manager of the Euclid Division of General Motors Corporation. He succeeds R. Q. ARMINGTON, who has resigned in order to devote full time to his family manufacturing interests.

Mr. Snow joined The Euclid Road Machinery Company in 1935

V. L. Snow

R. Q. Armington

as a member of the engineering design department.

Mr. Armington has been associated with Euclid since 1931, when The Euclid Road Machinery Company was incorporated from a division of a company founded by his father in 1899.

JOE R. VOGEL will be Philadelphia district manager for the Richardson Scale Company, Clifton, N. J. Mr. Vogel previously opened a Richardson district sales office at Boylston Center, Mass., to serve the New England area.

Pelican Machinery of Shreveport will be distributor for the Koehring Division of Koehring Company in northern Louisiana. The new distributorship will be under the same management as Pelican Machinery Company of New Orleans (Koehring distributor for southern Louisiana), but will operate as a separate entity. HOWARD ELROD will be in charge of Pelican Machinery Company of Shreveport at Bossier City, La.

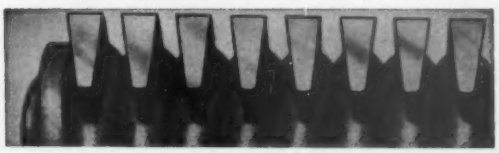
JAMES M. KNOX, 56, vice-chairman of the board of directors and former president of Research-Cottrell, Incorporated, died at his Basking Ridge, N. J., home on May 9 after a long illness.

HOW TO SELECT DEWATERING SCREENS THAT FIT YOUR REQUIREMENTS EXACTLY

How to select Perforated Plate

Let Hendrick suggest the analysis of H Quality Steel that will stand up longest under your operating conditions. Eliminate blinding with a Hendrick screen that provides full clearance. Get continued product uniformity from the accurate, uniform mesh of a Hendrick screen.

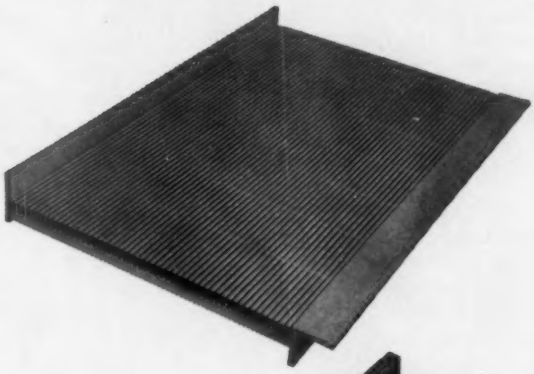
How to select Wedge Wire

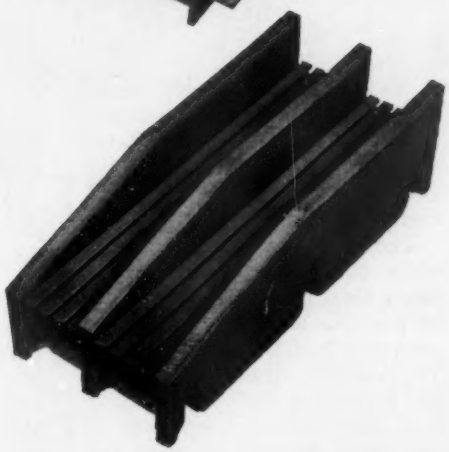


Here are three things to look for: 1) Free clearance—to reduce chances of clogging and blinding. 2) A tapered profile bar, for dewatering efficiency. 3) A deep profile bar, to assure long service life and maximum load-carrying capacity. Get all of these in Hendrick Wedge Wire. There is a type to suit your operating conditions and your needs—whether you want good screening efficiency, good dewatering efficiency, or high resistance to abrasion.

How to select Wedge Slot Screens

For more efficient processing, look for accurately spaced, uninterrupted slots. For heavy-duty service, look for thick, parallel head flanges that maintain uniformity of openings. To prevent abrasion by large chunks, specify Skid Bars. Hendrick offers all of these—*plus* 8 different profile bars. Hendrick will gladly help you select the type that will stand up best under your operating conditions.





Hendrick

MANUFACTURING COMPANY

Headquarters for All Your Screening Needs

39 DUNDAFF STREET, CARBONDALE, PA.

Perforated Metal • Perforated Metal Screens • Wedge-Slot Screens • Hendrick Wedge Wire Screens • Architectural Grilles • Mitco Open Steel Flooring — Shur-Site Treads • Armorgrids • Hydro Dehazers • Distillation Column Internals

Hendrick Manufacturing Co.
39 Dundaff Street, Carbondale, Pa.

Please send me your catalog on:

- ☐ H Quality Steel Perforated Plate
- ☐ Wedge Slot Screens
- ☐ Wedge Wire

☐ I would appreciate a call from a Hendrick Sales Engineer.

Name_____

Company_____

Address_____

City_____ Zone_____ State_____

Plans for a four-day construction equipment show to be held in September at the Koehring Company proving grounds near Waukesha, Wis., have been announced. All Koehring Company construction equipment divisions, subsidiaries, and branches will have exhibits at the show, which will be held in two flights, September 19 and 20, and 22 and 23.

In addition to the Koehring Division, Milwaukee, Wis., participating units will include: Buffalo-Springfield Company, Springfield, Ohio; Flaherty Manufacturing, Pocatello, Idaho; C. S. Johnson Company, Champaign, Ill.; Koehring-California Company, Stockton, Calif.; Koehring Export Division, Milwaukee; Koehring-Waterous Ltd., Brantford, Ont., Canada; Kwik-Mix Company and KA-MO Tools, Port Washington, Wis.; and Parsons Company and Shawnee Manufacturing, Newton, Iowa.

WILLIAM G. HETRICK has been appointed assistant advertising and sales promotion manager for the equipment divisions of Young Spring & Wire Corporation, Bowling Green, Ohio.

New engineering sales representatives for the Cleveland Worm & Gear and the Farval Divisions of Eaton Manufacturing Company, Cleveland, Ohio, to replace the Dingle-Clark Company, have been announced.

The Dingle-Clark Company, which has represented Cleveland Worm Gear and Farval for the last 36 years has recently announced its retirement from the agency business. The three new agencies, each exclusive engineering sales representative in its area, which now represent the two Eaton divisions are being operated by the former executives and staff of Dingle-Clark in those cities.

In Cleveland, the representative will be the R. V. Robison Company, with R. V. ROBISON in charge, and J. E. PETERS and E. J. GRUBER assisting. All had been members of the Dingle-Clark Staff.

In Pittsburgh the representative is the J. P. Murray Company, with J. P. MURRAY in charge, and G. L. ENGELBRET, L. B. ABRAMS, and T. F. HATCH, his associates in the former branch, working with him.

In Philadelphia, W. M. STILLWELL has formed a sales agency under his name. On his staff are T. B. RYAN and S. G. LUGAR, also members of the previous staff.

An expansion program is under way at Corhart Refractories, Louisville, Ky. The additional manufacturing capacity is required because of increasing demand by the steel industry for Corhart 104 refractory, used as a liner for hot zones in kilns.

PAUL M. HOLLINGER has been appointed general sales manager of Sutorbilt Corporation, Compton, Calif., manufacturers of blowers, gas pumps, and vacuum pumps. His appointment is in line with a major move to strengthen the company's sales activities and provide effective coverage for its expanding markets.

R. M. Purdy

ROBERT M. PURDY has been named sales manager of Chrysler Marine and Industrial Engine Division, Chrysler Corporation, Detroit, Mich.

Mr. Purdy was previously with Borg-Warner Corporation.

Worthington Corporation announces the appointment of Hasper Equipment Company, Muskegon, Mich., to handle the distribution of construction equipment in Michigan.

The appointment of Buckhorn Equipment Company, Cheyenne, Wyo., to handle the distribution of construction equipment in the state of Wyoming for Worthington was also announced.

Southwood Machinery Sales, Greenwood, Ind., has been appointed to handle the distribution of Worthington construction equipment in the state of Indiana.

JAMES P. KNEUBUHL has been elected president of Research Cottrell, Incorporated, by the board of directors. Mr. Kneubuhl succeeds J. WILLIAM HINKLEY, who will continue as chairman of the board of Research-Cottrell and as president of the parent organization, Research Corporation, a foundation.

Mr. Kneubuhl comes to Research-Cottrell from The Fluor Corporation, Ltd., Los Angeles, Calif., where he was vice-president in charge of utility and government sales.

Equipment Sales Company, Phoenix, Ariz., has been appointed a distributor for the Le Roi "S2" line of stationary air compressors. The firm is also a distributor of Le Roi portable air compressors and Newmatic air tools for the construction and mining industries.

EDWARD BURGERS JR. has been appointed sales manager of the Multiwall Bag Division of the Gilman Paper Company, New York, N. Y.

ALBERT S. QUINN JR. has been named sales representative for the Master Builders Company's Seattle branch office.

In his new position Mr. Quinn will be responsible for sales and field service activities to architects, engineers, contractors and ready-mix producers in the Seattle area.

Prior to joining the Master Builders Company, Mr. Quinn was for four years a sales engineer with the Stebbins Engineering Corporation of Seattle.

EUGENE T. UMPLEBY has been named district sales manager for Ramset Fastening System, part of the Winchester-Western Division, Olin Mathieson Chemical Corporation. He is responsible for sales in West Virginia, eastern Kentucky, southeastern Indiana, and parts of Ohio.

Mr. Umpleby was formerly district sales engineer and assistant sales manager for Phillips Industrial Products Company, Cleveland.

TWO LORAINS TEAMED FOR TOP TONNAGE

At Orange Quarry Company, West Orange, New Jersey two Lorains speed quarrying of trap rock. One, fitted with a skullcracker, breaks up shot rock from a twenty-five foot quarry face. The other, a 2½-yard Lorain 85-A shovel keeps two 16-ton trucks on the run, averaging 1300 yards in an eight hour day.

In the pit, in the yard or wherever your toughest jobs are, the rugged Lorain 85-A has field proven features to deliver more payloads faster.

"Shear-Ball" for smooth, steady swing . . . less wear. Lorain's exclusive turntable connection requires no adjustment, and less lubrication than other designs. And "Shear-Ball" is warranted for ten years against failure to function under normal use and service.

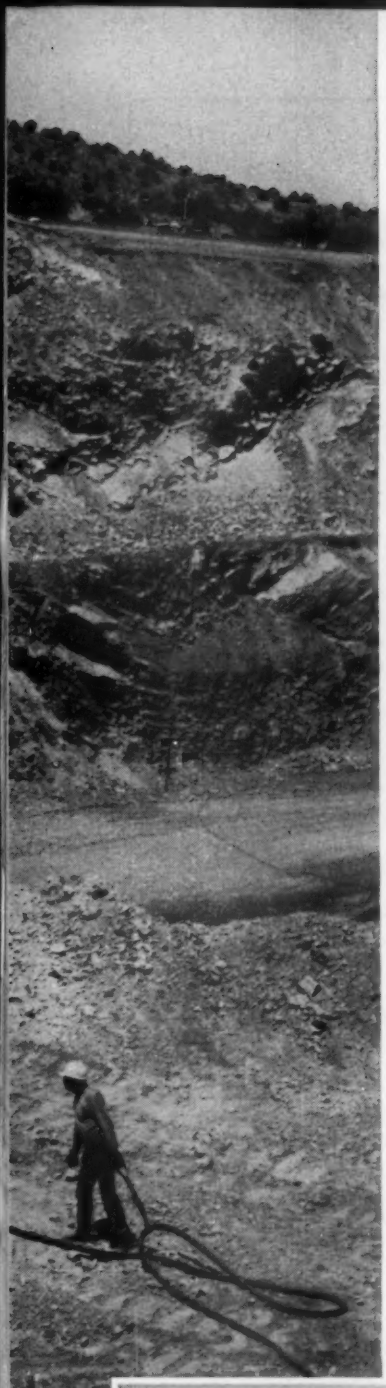
"Joy-Stick" for fast control. Just two levers provide precision control through metered-air power. You can blend many operations into smooth flowing cycles, yet retain the normal feel of the machine.

Convertibility for workability. The 85-A converts easily in the field. And it has the power and control to pay off whether you use it as a hard digging shovel or hoe, or as a crane, dragline or clamshell. See your Lorain distributor.

THE THEW SHOVEL COMPANY, LORAIN, OHIO

LORAIN® ON THE MOVE

Enter 298 on card, page 257



FROM THE BRITTLE COLD OF MINNESOTA'S MESABI RANGE
TO THE SOFTENING HEAT OF FLORIDA'S PHOSPHATE MINES—

Anaconda's new all-butyl Shovel Cable passes every life test

Heat, cold, kinks, even runovers and rock falls couldn't knock out this new shovel cable during months and months of torture-testing around the country.

That's because its new all-butyl *insulation* and *jacket* make it the toughest shovel cable you can buy. And—one of the most economical over the long haul. Anaconda's new process butyl—as an insulation—has proved its ability to take pinching, crushing and the effects of moisture and ozone in many fields—from extra-high-voltage power cable to surface mining. And now it's available to you as a *jacket* in Anaconda's new shovel-cable construction.

Because of its superb service record, the inner construction of this new cable remains the same. For example, you still get Anaconda's patented rubber-core grounding conductors which minimize wire breaking and offer greater ground protection. Also included are special shields of copper cross-braided with cotton—a construction which makes the braided shield lie flatter and eliminates chafing. In addition, this feature makes for much easier and faster splicing. Both electrically and mechanically, Anaconda shields are superior to all-metal construction.

Only Anaconda offers you this job-tested shovel cable with all these construction extras in a proven design. Add up the features—they mean extra cable life and dollar savings.

So, call the Man from Anaconda and ask him about the new Anaconda all-butyl Shovel Cable. Or write: The Anaconda Wire & Cable Co., 25 Broadway, New York 4, N. Y.

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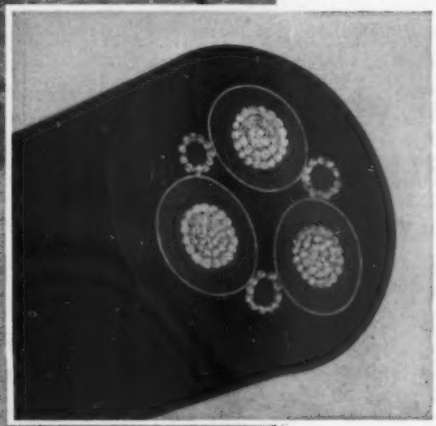

ASK THE MAN FROM

ANACONDA®

ABOUT THE ALL-BUTYL SHOVEL CABLE

Another New Product From Anaconda's Rubber Cable Center

Note the heavy-duty weather-resistant butyl jacket—the rubber core grounding wires—also see how the ground wires make constant contact with conductor shields.

WHAT YOU SHOULD KNOW ABOUT AIR TOOL UPKEEP

Ordinary oil separates from water

NON-FLUID OIL
TRADE MARK REGISTERED

is compatible with water

Until the introduction of NR Grades of NON-FLUID OIL, users of all types of pneumatic powered units have fought a losing battle with the moisture content of all compressed air. No regular oil worked with this moisture; it was a constant fight with power and efficiency on the losing side.

NR Grades work on the logical principle, "if you can't lick it, join it." Our specially designed and engineered grades for pneumatic service form a permanent emulsion with this airborne moisture, thus eliminating the normally accepted sticking, gumming and rusting. That's why pneumatic tool manufacturers use and recommend the NR Grades of NON-FLUID OIL for their tools.

Write for Free Testing Sample and Bulletin No. 550.

NEW YORK & NEW JERSEY LUBRICANT COMPANY

292 Madison Ave., New York 17, N. Y.
WORKS: NEWARK, N. J.

WAREHOUSES

Birmingham, Ala.	Charlotte, N.C.	Springfield, Mass.	Providence, R.I.
Atlanta, Ga.	Greenville, S.C.	Greensboro, N.C.	St. Louis, Mo.
Columbus, Ga.	Chicago, Ill.	Detroit, Mich.	

Also represented in principal industrial centers, including Pittsburgh, Pa., Cleveland and Cincinnati, Ohio

NON-FLUID OIL is not the name of a general class of lubricants, but is a specific product of our manufacture. So-called grease imitations of NON-FLUID OIL often prove dangerous and costly to use.

Enter 300 on card, page 257

IDLE EQUIPMENT WASTES MONEY!

Got an old crusher sitting around doing nothing? A kiln? A shovel? Why not convert that idle equipment into ready cash!

Pit and Quarry's Broadcast pages are read each month by thousands of men in the industry. Some of them are probably looking for exactly the machine you're no longer using and would like to sell.

Most of our Broadcast advertisers have been with us for years. They know that their ads in *"The Marketplace of the Industry"* are bringing results.

A small ad costs you only $10.50 and we'll be glad to send you a rate card if you're interested in larger ads running more than once. Just drop us a line.

PIT and QUARRY PUBLICATIONS, INC.

431 S. Dearborn St.
Chicago 5, Ill.

These TYLER screens float– so you save structural costs

This battery of Tyler vibrating screens, in a plant of the latest design, is handling copper ore at a high production rate, and does its work without transmitting vibration to the base frame of the screen.

The vibrating screen body—as well as the drive shaft—floats on special rubber mounts. And moving parts are designed to be in dynamic balance at all times. With all the machine's energy being used to separate the materials, there's no need for secondary building structures and supports. Many Ty-Rock screens rest in operating position by their own weight without any bolted attachments.

Ask your Tyler representative to give you full information—and recommend equipment perfectly matched to your needs. That's Tyler Screening Service.

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WHICH JOB WOULD YOU TAKE?

If you're like most of us, you'd take the job with the more tempting salary and the brighter future.

Many college teachers are faced with this kind of decision year after year. In fact, many of them are virtually bombarded with tempting offers from business and industry. And each year many of them, dedicated but discouraged, leave the campus for jobs that pay fair, competitive salaries.

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These men are not opportunists. Most of them would do anything in their power to continue to teach. But with families to feed and clothe and educate, they just can't make a go of it. They are virtually *forced* into better paying fields.

In the face of this growing teacher shortage, college applications are expected to *double* within ten years.

At the rate we are going, we will soon have a very real crisis on our hands.

We *must* reverse this disastrous trend. You can help. Support the college of your choice today. Help it to expand its facilities and to pay teachers the salaries they deserve. Our whole future as a nation may depend on it.

It's important for you to know more about what the impending college crisis means to you. Write for a free booklet to: HIGHER EDUCATION, Box 36, Times Square Station, New York 36, N.Y.

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JULY 1960

BROADCAST

Section

MEN WITH GYPSUM EXPERIENCE

Several key positions will be open for men with Gypsum experience in the new plant at Cody, Wyoming, which will be in operation January 1. A few of these openings will be filled by end of August.

Cody is a town of 5,000 population with excellent schools and living conditions, and a paradise for people who like hunting and fishing. All inquiries held strictly confidential. Write giving detailed experience to

Big Horn Gypsum Company
818 Kearns Building
Salt Lake City 1, Utah

Engineer

Concern in northeast requires Engineer with experience in design and layout of crushed stone and sand and gravel plants. Must be capable of supervising drafting department and have background in structural design. Please forward full particulars and salary requirements in first letter.

Box No. PQ-366-G, c/o Pit and Quarry Publications
431 S. Dearborn St. Chicago 5, Illinois

FOR SALE OR RENT

2½ Yd. Link-Belt Crane-Dragline. K-595. 140' Boom & Jib. Caterpillar D-17000 Engine.
1 Yd. Lorain L-50. 60' Bm. GM Diesel. New 1951.
40/50 Ton American Diesel Loco. Crane.
25 Ton Brownhoist Diesel Loco. Crane.
45 Ton Gen. Elec. Diesel Elec. Locos.
25 Ton Gen. Elec. Diesel Elec. Loco.
75 Ton Whitcomb Diesel Elec. Loco. 500 HP Cat. New 1951.

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1905 Railway Exchange Bldg., St. Louis 1, Mo.
CHestnut 1-4474

CHEMIST — CEMENT PLANT

A midwest cement producer has opening for man to fill the position of cement plant chemist. Must be college graduate with degree in chemistry. Should have at least two years' experience in chemical process control, preferably in the cement industry. Excellent employee benefits including an attractive stock option plan. Please send complete resume including salary requirements.

PQ-369-G, c/o Pit and Quarry Publications
431 So. Dearborn St. Chicago 5, Illinois

WANTED
Maintenance Engineer

With established background capable of complete charge of maintenance at Texas quarry and processing operations. College graduate preferred but not essential. Age 30-50. Submit complete resume, including education, experience, references, and salary requirements in confidence to:

Box No. PQ-367-G, c/o Pit and Quarry Publications
431 So. Dearborn St. Chicago 5, Illinois

WANTED
GENERAL SUPERINTENDENT

For Sand & Gravel Plant and Concrete Co. Duties: In charge of production and all maintenance and 20 to 25 employees. Only Experienced Man Need Inquire. References Required.

Box No. PQ-368-G, c/o Pit and Quarry Publications
431 So. Dearborn St. Chicago 5, Illinois

POSITION WANTED

Mining Engineer, Age 45, 20 years experience mining, plant construction design and operation. Desires position as plant manager or quarry superintendent.

Box No. PQ-371-G, c/o Pit and Quarry Publications
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Quarry For Sale
Due To Illness

Plant In Operation. Large Quantity Of Stone Shot Up.

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Mature man to manage an established Asphalt Plant Division of a diversified manufacturing plant, located on the Eastern Seaboard. Must be capable of supervising engineering, designing, and sales of Asphalt Plants and their various components. Reply by letter stating experience and salary requirements.

Box No. PQ-355-F, c/o Pit and Quarry Publications
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FIELD ENGINEER

Large southeastern rock processing company with multi-units has responsible position open for experienced engineer with construction superintendent background. Will be part of small capable construction engineering group in expanding profitable operation. Opportunity for future directly related to your ability and potential. For more information please send details about yourself in strict confidence:

Address:

Box No. PQ-365-G, c/o Pit and Quarry Publications
431 So. Dearborn St. Chicago 5, Illinois

ENGINEER

The position of staff engineer is open with a midwest cement producer. Applicants with a degree in engineering should have a minimum of five years' experience, preferably in the cement industry or be familiar with equipment used in the manufacture of portland cement. Duties include design, estimating and some supervision of equipment during installation along with assignments on major repairs and process control. Outstanding employee benefits program including attractive stock option plan. Please send complete resumé including salary requirements to:

Box No. PQ-370-G, c/o Pit & Quarry Publications
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LIQUIDATING BRIQUETTE PLANTS

2—Ruggles-Coles Class #XA-18, double shell indirect-direct heat rotary dryers, 104" x 70' x ⅝" shell.
2—Komarek-Greaves, briquetting presses, 75 HP, 25 tons per hour.
4—Komarek-Greaves vertical Fluxers.
4—K-G Horiz. Fluxers 41" dia., 50 HP.
4—K-G Pug Mills, 30" dia. x 14'4".
3—Tyler Screens, 4' x 6'.
2—43" wide cooling conveyors.
6—Robinson Sawtooth Crushers.
2—Pa. Crusher #C-3-30 hammermills.
20—Welded Steel bins, cone bottom, from 15,000 gallon to 90,000 gallon.
1—Keeler Boiler 200 HP, 160 PSI.
8—Bucket elevators, 62' and 90' c-c.

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PLANTS: Telsmith 2536, CR1036, 1536, 1824, 2036, 2236, Univ. 880 Port. Crushing.
CRUSHERS: 1036, 1536, 1836, 2036, 2436, 3240, 3642, 4240, 4860 JAW. 9K, 12K Gates. AC322R, 530, 636, 848R, 25½ & 37½ Kennedy, 28", 25B Telsmith GYR. 3' Cone std. & S/H. 1836, 1842 sgl. 3018, 4024, 5424 Dbl. ROLL.
DRYERS: 5x15, 4x20, 4x30, 5x16, 5x24, 8x70.
36"x20', 8"x36' double LOG WASHERS.
FEEDERS: 3x8, 3x10, 3x14, 4x20 Apron. LOADERS.
MILLS: Raymond 5047, Williams Gnome Roll. Dixie 3630, 3650, Williams #30, #40 Hammer. 5x17, 5x21 Tube. Mikro 28P. Bradley Sr.
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CONVEYORS: 18"x135', 24"x115', 36"x60', 60"x 300'.
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BROADCAST SECTION

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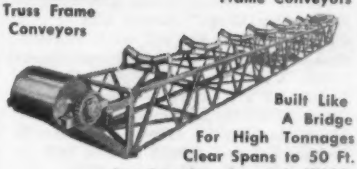
BONDED TROUGHING IDLER CONVEYOR BARGAINS

8" Jr. I Beam Frame Conveyors

Truss Frame Conveyors



Built Like A Bridge For High Tonnages Clear Spans to 50 Ft.

Any Length - Any Belt Width.

Complete Pre-Fab sections of 8" Jones & Laughlin Jr. I Beam Frame Conveyors quickly and easily joined together on the job. These beams are rolled with .20% Copper Content. Atmospheric exposure tests disclose that Junior Beams with .20% Copper have as much as four times the resistance to corrosion as non-copper steels. Braced with structural angle, welded to frame for maximum rigidity. Equipped with 5" roll diameter idlers and return rolls, 20" diameter head pulley and 16" diameter tail pulley, mounted on 2¼" or 2 7/16" diameter shaft.

We take our loss on our stock of short length belting. You can save as much as 50% on BONDED CONVEYOR SPECIALS, with conveyor belting in two pieces. Belt is new 4-ply, 28 oz. duck, ⅛" top rubber cover x 1/32" bottom cover Major grade belt and is Fresh Stock made by leading manufacturers. **WRITE FOR BULLETIN #1136.**

Bonded troughing idler conveyors also available in Truss Frame Construction. **WRITE FOR BULLETIN #1189 AND PRICES.**

8" JR. I BEAM CONVEYOR PRICES

CONVEYOR PRICES INCLUDE BELTING

Belt Width	Length of Conveyor	List Price	Sale Price	Add or Deduct Per Foot
14"	25'	$1425	$ 766	
14"	50'	2266	1181	$16.62
14"	85'	3445	1763	
16"	20'	1287	700	
16"	45'	2180	1128	
16"	60'	2715	1384	$17.10
16"	90'	3786	1897	
18"	25'	1507	830	
18"	45'	2281	1190	
18"	70'	3205	1641	
18"	85'	3771	1912	$18.03
18"	100'	4337	2182	
18"	130'	5469	2723	
20"	25'	1547	871	
20"	60'	2940	1546	
20"	75'	3536	1836	$19.30
20"	90'	4133	2125	
24"	25'	1622	922	
24"	45'	2479	1335	
24"	70'	3550	1852	$20.68
24"	100'	4835	2473	
24"	120'	5692	2886	
24"	150'	6977	3507	
30"	50'	2969	1591	
30"	70'	3948	2054	$23.17
30"	90'	4928	2518	
36"	25'	1854	1105	
36"	45'	2915	1623	$25.91
36"	60'	3711	2012	
36"	100'	5832	3048	

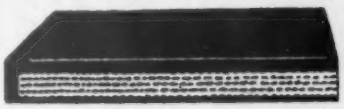
Other lengths and belt widths priced upon application.

BONDED 30" DEEP TRUSS CONVEYORS also built in heavy duty Portable Models. Available with Screen and Feeder and with mast or mastless type undercarriage and hydraulic powered mechanism. Lengths to 60 feet and belt widths through 30 inches. Equipped with Tow Hitch for easy moving from one job-site to another.

PRICED FROM $2365.

TESTED CONVEYOR BELTING *

WE PAY FREIGHT ON 200 POUNDS OR OVER. AN ADDITIONAL 10% SAVINGS FROM SALE PRICE FOR FULL ROLLS 500 TO 650 FEET.



MAJOR BRAND: 12# to 15# Friction Pull. 800# to 1000# Cover Tensile. Heavy Duty, 28 oz. duck. ⅛" top x 1/32" bottom rubber covers. Tough cotton duck, strong carcass and proper flexibility. Used in moving boxes, bags, coal, sand, gravel, crushed stone, salt, earth and similar materials.

Width	Ply	Domestic Belt Per Foot
14"	4	$2.94
16"	4	3.09
18"	4	3.42
20"	4	3.95
24"	4	4.43
30"	4	5.42
36"	4	6.43

MAJOR C-BEE BRAND: SMOOTH SURFACE: 15# to 17# Friction Pull. 1600# to 2400# Cover Tensile. 32 oz. duck. Skim coat between plies. Heavy Duty belt for severe service and abrasion resistance.

Width	Ply	Top Cover	Bottom Cover	Imported Belt Per Foot
14"	4	1/8"	1/32"	$2.96
16"	4	1/8"	1/32"	3.12
18"	4	1/8"	1/32"	3.44
20"	4	1/8"	1/32"	3.97
24"	4	1/8"	1/32"	4.46
30"	4	1/8"	1/32"	5.56
36"	4	1/8"	1/32"	6.45
The Following Belts Are 32 Oz. Duck. 5 Ply:				
24"	5	1/8"	1/16"	$5.33
30"	5	1/8"	1/16"	6.59
36"	5	3/16"	1/16"	8.45

MAJOR BEE BRAND: 16# to 19# Friction Pull. 2400# to 3000# Cover Tensile. Skim Coat Between Plies. A high grade of heavy duty 28 oz. duck, ⅛" top x 1/32" bottom rubber covers. For severe service and abrasion resistance. For stone, mineral ores, concrete, cement and coal.

Width	Ply	Domestic Belt Per Foot	Imported Belt Per Foot
14"	4	$3.18	$2.98
16"	4	3.60	3.14
16"	4	3.98	3.47
20"	4	4.54	3.99
24"	4	5.14	4.50
30"	4	6.31	5.58
36"	4	7.64	6.50
24"	5	6.01	5.25

MAJOR B-X SMOOTH SURFACE: 20# to 24# Friction Pull. 3400# to 4000# Cover Tensile. A heavier duty belt with ⅛" top x 1/32" bottom covers. For higher abrasion resistance and handling of materials where more strength is required.

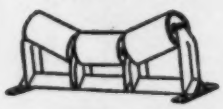
Width	Ply	Domestic Belt Per Foot	Imported Belt Per Foot
16"	4	$3.93	$3.31
18"	4	4.37	3.64
20"	4	4.98	4.02
24"	4	5.63	4.71
30"	4	6.92	5.80
36"	4	8.16	6.84

*** All belting is tested by the Engineering laboratory of one of the largest universities in the United States. It is guaranteed to meet or exceed listed specifications.**

Other widths, plies, duck weights and cover thickness available at low prices.

WRITE FOR FREE SAMPLE & BULL. #1203

BONDED® ILDERS & RETURN ROLLS FOR UTMOST ECONOMY ON THE JOB



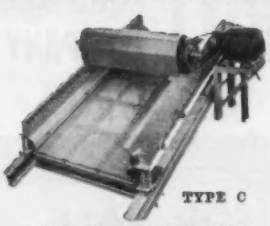
3-roll, 5" diameter Troughing Idlers for:			
14" belt	$19.75	24" belt	$22.75
16" belt	20.50	30" belt	23.85
18" belt	21.90	36" belt	24.90
20" belt	22.10	48" belt	27.50
1-roll, 5" diameter Return Rolls for:			
14" belt	$ 8.50	24" belt	$11.00
16" belt	9.00	30" belt	12.50
18" belt	9.50	36" belt	13.75
20" belt	10.00	48" belt	16.50

All steel. Interchangeable with other well-known makes. Furnished with replaceable prelubricated sealed ball bearings. Maintenance is negligible. **WRITE FOR BULLETIN #1136.**

BONDED® VIBRATING SCREENS

PROMPT SHIPMENT OF ALL MODELS

SPECIAL SERVICE SCREENS



TYPE C

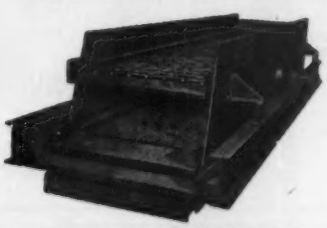
WRITE FOR BULLETIN #1224

For scalping middle-range pieces and accurate sizing of fines but where quantity and feed do not warrant a larger capacity, heavy duty model. Medium to heavy construction. Can also be suspended from four steel cables and springs for portable or temporary installation. Vibration remains in working screen body. No shaking of tipple, building or platform.

Priced from $487

WRITE FOR "SEVEN SECRETS OF SUCCESSFUL SCREENING" IN BULL. 1086.

HEAVY DUTY SCREENS



FACTORY BALANCED CONTROLLED VIBRATION. Four bearing positive throw eccentric shaft; 3' x 6' to 5' x 14', 1 to 5 decks. **WRITE FOR BULLETIN NO. 1087—"9 REASONS WHY BONDED IS YOUR BEST BUY."**

For high tonnages, heavy scalping and multiple sizing of such minerals and industrial products as handled by above models. No dead spots. Springless live-rubber mounting of screen body controls vibration. Screen cloth and plate in all models reversible for longer life. Their finished edges prevent plates from splitting and cloth from ravelling.

Priced from $1620

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1—Traylor Compeb Mill, 7' x 27', 500 H.P.
2—Hardinge 10' x 48", 8' x 36" Conical Ball Mills, motor driven.
1—Denver 3' x 5' Continuous Ball Mill.
1—Telsmith Red. Crusher No. 46, 50 H.P.
2—Kennedy #6 Gyratory Crushers, 50 H.P.
5—Jaw Crushers 12" x 18" to 36" x 48".
1—Penn. Non-Clog Swing Hammermill, size 5060, Hopper opening 47" x 60", cap. 200-275 tons per hour. UNUSED.
1—Penn. Super-Thor Hammermill, size SXT-13, 250 H.P.

AIR SEPARATORS—SCREENS

1—14' diameter Raymond Double Whizzer Separator with 60 HP motor.
1—10' diameter Raymond Single Whizzer Separator with 15 HP motor.
1—8' Gayco Air Separator with 10 HP motor.
1—Link Belt 6' x 14' double deck Vibrating Screen.
1—Tyler Hummer Screen 4' x 10'.

CONVEYORS

1—Fuller-Kinyon Conveying System, type H257, 100 H.P.
2—Fuller-Kinyon Conveying Systems, type 10-B-No. 8, 75 H.P.

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ROTARY KILNS - DRYERS - COOLERS

1—Traylor 11' x 155' Rotary Kiln, 7/8" shell.
1—Allis Ch. 9' x 130' Rotary Kiln, 3/4" shell.
2—Allis Ch. 7'6" x 7' x 125' Rotary Kilns.
1—Bonnet 5' x 40' 3/8" shell Rotary Kiln.
1—Traylor 8' x 80', 5/8" shell.
1—Vulcan 8' x 80', 1/2" shell.
1—Vulcan 7' x 80', 1/2" shell.
2—Link Belt Roto Louvre Dryers, 6'4" x 24'.
1—Rennenberg 6' x 50', 3/8" shell.
1—Ruggles Cole 5' x 30', 3/8" shell.
1—Allis Chalmers, 4' x 40'.
1—Allis Chalmers 4' x 30', 3/8" shell.
1—3'x36', 3/8" shell.
1—34" x 30', 5/16" shell.

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BRILL EQUIPMENT COMPANY

35-59 Jabez Street Newark 5, N. J.
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MANHEIM, W. VA.

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1—Mosser 4'x47'x5/16" Rotary Dryer
1—Traylor 8'x11' Steel Lined Ball Mall
2—Beth. Fdy. 7'x24' Compeb Mills
2—Allis-Chalmers 6K; 8K Gyratorys
1—Barber Greene Model 82A Loader

STOCK ITEMS

8'x60'x1/2" Welded Rotary Kiln
Vulcan 6'x120'x1/2" Rotary Kiln
3'x3'x12' Horiz., 4'x9'x12' vert. Puggers
Komarek-Greaves 27"x24" Briquet Presses
6'x25'; 6'x50' Louisville Rotary Dryers
7'x50'; 8'8"x70' Ruggles-Coles Dryers
Dixie #5060 Mogul Hammermill
15"x8" to 36"x36" Jeffrey Hammermills
Raymond 3 Roll #3036 Hi-Side Mill
Raymond #50, #40 Impact Mills
6—Tyler Hummer Screens 4'x8', 4'x6'
4—Robinson Saw Tooth Crushers
535'—24" Troughing Belt Conveyor
Bucket Elevators 45' to 90' Centers
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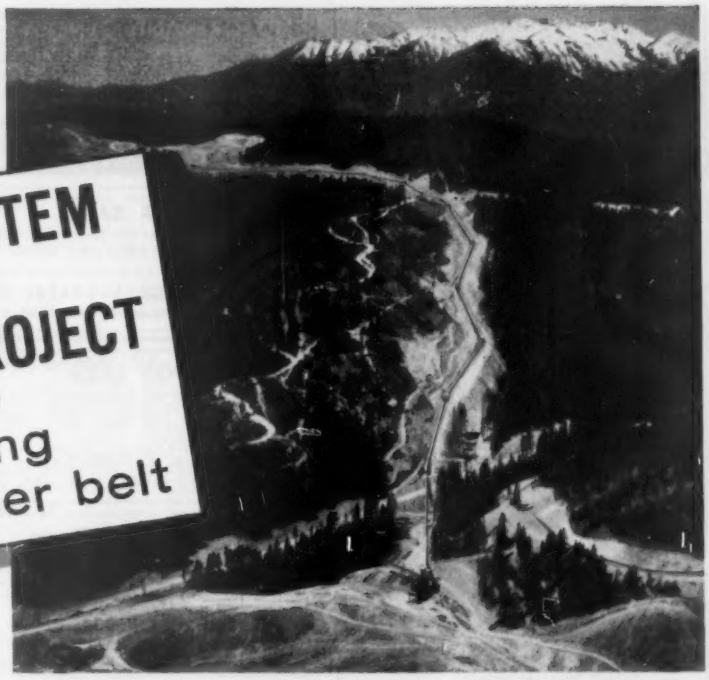
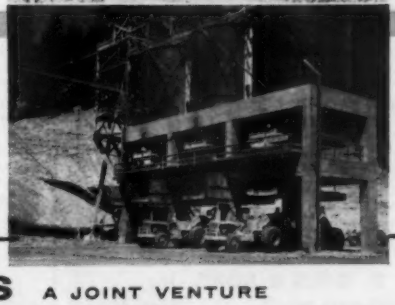
2 miles long
42" wide rubber belt



9 FLIGHTS—AVAILABLE INDIVIDUALLY. Flights range from 672 ft. long to 1885 ft. long. Conveyor moves approximately 1700 cu.yds. per hour of impervious fill material (weathered andesite) on 850 ft. drop at 720 feet per minute from borrow pit to earth fill dam. Five flights descend a 25% grade. Much of braking effort is from electric motors acting as generators under full belt load. Also mechanically operated brakes bigger than those of a power shovel. Conveyor has operated reliably on this three year job. Complete system includes the following:



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Two drive-over hoppers with slotted tire track troughs for scraper discharge from borrow area.

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Charged by 48" belt. Feeds main belt and acts as upper end control station. Impactor type crushers with rolls on eccentrics reduce oversize to about 6"

NINE CONVEYOR FLIGHTS

Individual flight data provided on request. Motor sizes range from 30 hp to 300 hp. Total horsepower of entire conveyor is 3280 of which 2000 hp is within the regenerative system (5 flights on 25% grade) where power generated is fed back into main system. All flights but one employ gravity type takeups. Troughing idlers are 20°, 3 roll, 5" diameter spaced from 2.75 ft. to 4 ft. apart. Impact idlers are used at transfer points. Band type brakes are used on tail pulley shafts on all but one flight. In addition, thrustor brakes are mounted on the high speed shaft between gear reducer and motor on the 5 flights on the 25% grade.

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Three bins with total capacity of 1000 cu. yds. can load three CAT DW20's simultaneously. Scraper can pull in, load and pull out in 20 seconds. Bins are charged from a 60" wide shuttle conveyor with water added. By-pass belt can stack material on ground. At bottom of each bin is a pair of 7 ft. opening roller gates operated by large size air rams. Material falls through gap into automatic weighing hopper. Air ram operated roller gates tripped to discharge 25 cubic yard loads.

16 mm color motion picture of conveyor available on request for private showing

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SPECIAL

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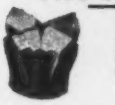

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3½-yd. Lima 1250 shovel loads blasted rock in Canadian quarry.

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If you want to move more rock faster, easier and more profitably—Lima's the shovel for you!

Take the Lima 1250 as an example. Its main and auxiliary functions are air-controlled for smooth precision performance at full capacity operation. Torque converter, with either Diesel or electric power, reduces shock loading . . . makes heavy digging and rock handling easy on both machine and operator. The type 1250 can be knocked down for over-the-road transfer from job to job.

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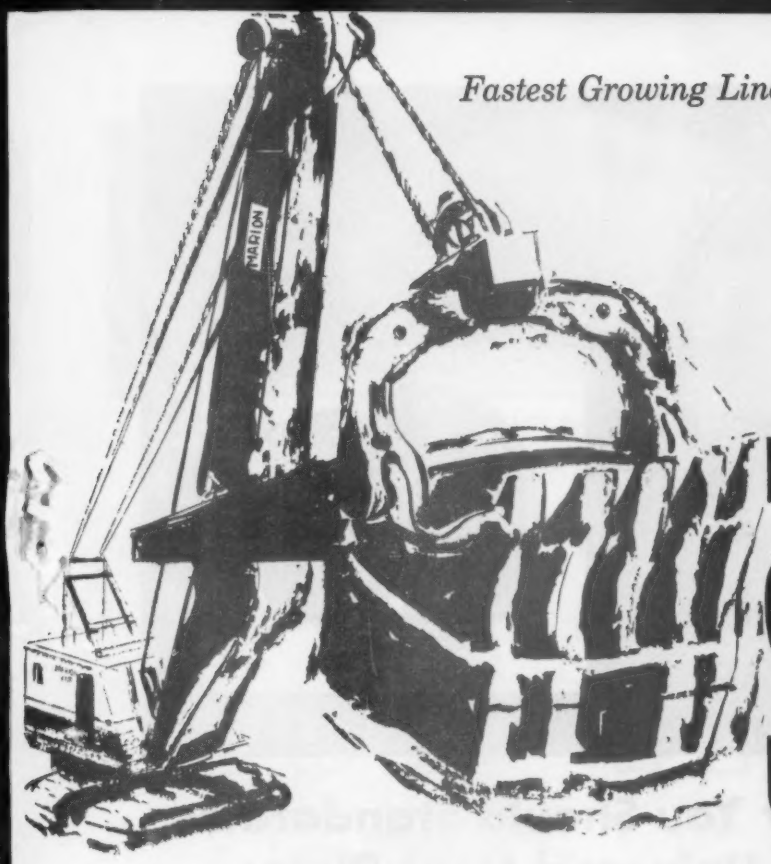

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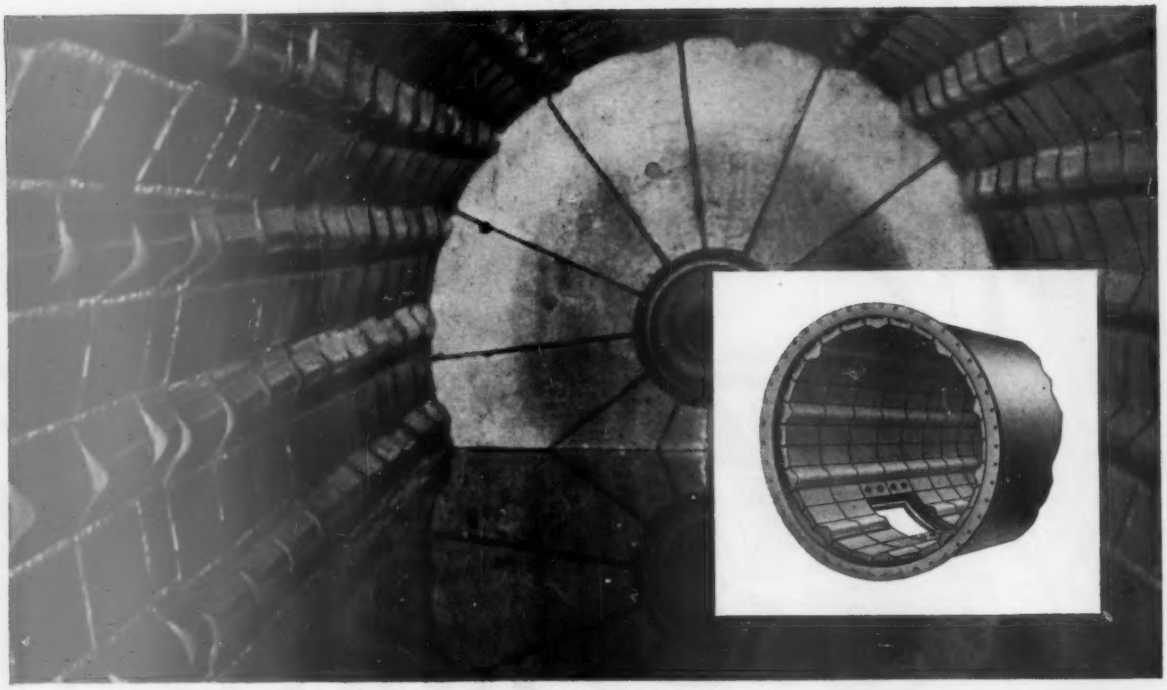

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5. Reduces Costs in Storage Space—because small castings stack easily, little storage space is required. One design of casting interchangeable for all size mills also simplifies records.
6. Reduced Costs in Liner Inventory—standardization is possible because one design fits all diameters of mills. Standardization means quicker unloading and storage.
7. Reduced Costs on Breakage Claims and Delays for Replacements—small castings are rugged and almost impossible to break by handling. Large castings of hard, brittle irons sometimes break in shipment.
8. Reduced Costs in Determining Most Efficient Wear Patterns—you can get wear profiles consisting of all lifter ribs or all flats from the same castings, as well as a combination of both including straight or spiralled lifter pattern.

Liners are supplied in two nominal thicknesses, 1½″ and 3″ with 1½″ high lifters. Castings are 6″ wide x 12″ long. Positive seating of small castings on mill shell means less breakage of castings under operating conditions. For additional information on B&W Universal Tube Mill Liner Plates write The Babcock & Wilcox Company, Boiler Division, Barberton, Ohio.

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S-471

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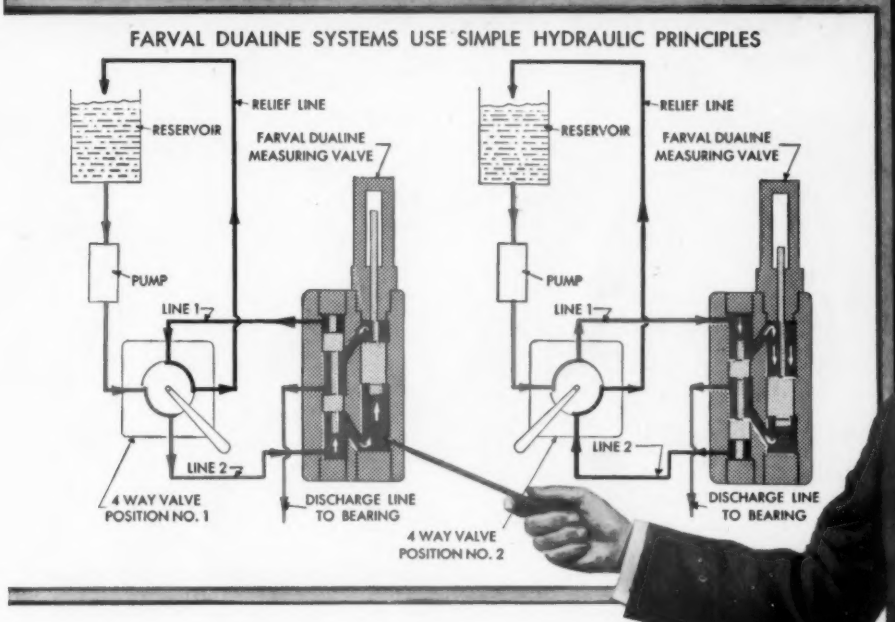
FARVAL
—Studies in Centralized Lubrication
No. 246

"For positive lubrication of large, medium and heavy-duty installations . . . it's a Farval Dualine System!"



With Farval Dualine centralized lubricating systems you get the following distinct advantages over other type systems . . .

(a) Much lower operating pressures with consequently less danger of soap separation on grease systems. Also, less danger of system damage due to high lubricant pressures.

(b) Large lubricant passages with no pinhole ports, ensures practically full pump pressure for every metering valve. This is one of the reasons why Farval Dualine systems operate on lower pressures — give less sieving and working of lubricants.

(c) Positive indication at each bearing — does not have to depend on the questionable action of a single indicator at the pump.

(d) Each metering valve individually adjustable for the requirements of the bearing it serves.

(e) Independent metering valve operation. Should trouble develop with one valve, the system will continue to operate. Only one bearing (not all the bearings) will require hand lubrication until trouble is corrected.

(f) True lubricant metering. Quantity of lubricant delivered to one bearing is not dependent on any other valve in the system.

(g) Much easier to spot and correct trouble.

Check with your Farval Representative and see how these versatile systems can improve production operations — reduce costs. Or write for free Bulletin 26-T containing complete engineering information on Farval Dualine systems.

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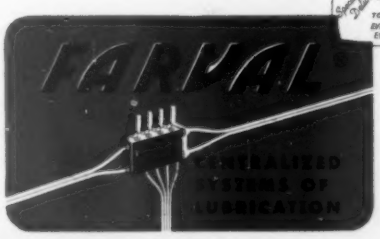

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